CO-PO-PSO ATTAINMENT PROCESS MANUAL

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Vision

To emerge as the most preferred pharmacy educational institute with global recognition and developing competent and socially sensitive pharmacists committed to healthcare needs of society.

Mission

- To develop students as global citizen with conscience, commitment and dedication.
- To create world class facilities and ambience for advanced level of teaching, research and practical training.
- To recruit and retain highly motivated and qualified faculty to promote the cause of teaching and learning.

DEFINITION

Course Outcome

They are the resultant knowledge skills the student acquires at the end of a **course**. It defines the cognitiveprocesses a **course** provides.

Program Outcomes

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes

Program Specific Outcomes are statements that describe what the Pharmacygraduates should be able to do.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

The specific objectives of a programme can be defined on following counts:

A. **Basic Knowledge:** Graduates of the program will be having strong background in pharmaceutical sciences and able to use these tools in Pharmaceutical industry, hospitals and/or institutes for success.

B. **Core Competence:** To provide students with a solid foundation in Pharmaceutics, Pharmaceutical Chemistry, Pharmacology and Pharmacognosy fundamentals as per the requirement of Pharmaceutical Industries, Community and Hospital Pharmacy, Clinical Research and also to pursue higher studies.

C. **Extensiveness :** To train students with respect to following aspects:

- ✓ Drug regulation
- ✓ Drug Management
- ✓ Drug Production
- ✓ Patient Management
- ✓ Management of Health Services
- ✓ Generation of Information
- ✓ Dissemination of Information
- ✓ Community Leadership
- ✓ Pharmacovigilance

D. **Training:** To train students to excel in postgraduate programmes or to succeed in technical profession through rigorous education.

E. **Professionalism:** To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate Pharmaceutical Sciences issues to broader social context.

F. **Assessment:** Graduates of the program will be able to evaluate pros and cons, benefits and deficiencies of the matter they studied; pharmaceutical technology they learned and ideology they observed in the field of Pharmaceutical sciences.

PROGRAM OUTCOMES (POs)

1. **Pharmacy Knowledge:** An ability to acquire , demonstrate, core and basic knowledge of Pharmaceutical and Life Sciences
2. **Planning Abilities:** An ability to develop, implement, effectively plan and organize work using time management, resource management, delegation skills and organizational skills to achieve goals in specified timeline.
3. **Problem Analysis:** An ability to identify, analyze, interpret data and take appropriate decision to solve problems related to routine Pharmacy Practices by applying acquired knowledge.
4. **Modern Tool Usage:** An ability to understand, choose and utilize Modern techniques and computing tools for Pharmacy practices by considering constraints.
5. **Leadership Skills:** An understanding of pharmaceutical management principles and apply these to one's own work, as a member and leader in a team, to manage projects to facilitate improvement in social health and well being.
6. **Professional Identity:** Ability to recognize, analyze and communicate Pharmacy professional values as a healthcare promoter.
7. **Pharmaceutical Ethics:** Ability to understand and use professional, ethical, legal, social issues and responsibilities for well being of the society.
8. **Communication:** An ability to comprehend, write reports, present and document to communicate effectively for exchange of professional information to Pharmacy community and society.
9. **The Pharmacist and Society:** An ability to overcome the societal, health and legal problems by providing better pharmaceutical care relevant to the Pharmacy profession.
10. **Environment and Sustainability**: An ability to recognize the impact of the professional Pharmaceutical solutions in social and environmental circumstances for sustainable development.
11. **Life-Long Learning:** An ability to recognize the need to engage in continuous Professional development by taking in consideration timely feedback and technological changes for lifelong learning process.

PROGRAM SPECIFIC OUTCOMES (PSO)

Pharmacy Students are able to:

PSO 1: Build graduate to excel in technical or professional careers in various pharmaceutical industry and/ or institute and /or Health care system through rigorous education. Also analyze and communicate the skills, values of their professional roles in society.

PSO 2: Learn, select, apply appropriate methods, procedures, resources and modern pharmacy-related computing tools with an understanding of the limitations.

PSO 3: Operate, control, analyze and evaluate chemical substances and finished products also processes within permissible limits.

PSO 4: Design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, sustainability social, ethical, health, safety and manufacturability for humans.

THE POs ARE PUBLISHED AND DISSEMINATED

The Program Outcomes are published and disseminated as follows

HOW TO PUBLISHED	WHERE TO PUBLISHED	HOW DISSEMINATED
Incorporated in presentation given in Orientation, Course files, Academic Book	Academic Book, Course Files, Laboratories in the Departments	Discussed during OrientationDay Discussed during student Counseling Distributed in Course file, Academic Book
Flex	Class Rooms/Laboratories Department, Notice Boards,	Self-reading by Students, Parents and Alumni
Digital Media	Institute Website: www.wcopcpravara.in	Available for Self-reading in public domain

BLOOM'S TAXONOMY

Bloom's Taxonomy was created by Benjamin Bloom in 1956, published as a kind of classification of learning outcomes and objectives that have, in the more than half-century since, been used for everything from framing digital tasks and evaluating apps to writing questions and assessments.

The original sequence of cognitive skills was Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The framework was revised in 2001 by Lorin Anderson and David Krathwohl, yielding the revised Bloom's Taxonomy. The most significant change was the removal of 'Synthesis' and the addition of 'Creation' as the highest-level of Bloom's Taxonomy. And being at the highest level, the implication is that it's the most complex or demanding cognitive skill–or at least represents a kind of pinnacle for cognitive tasks.

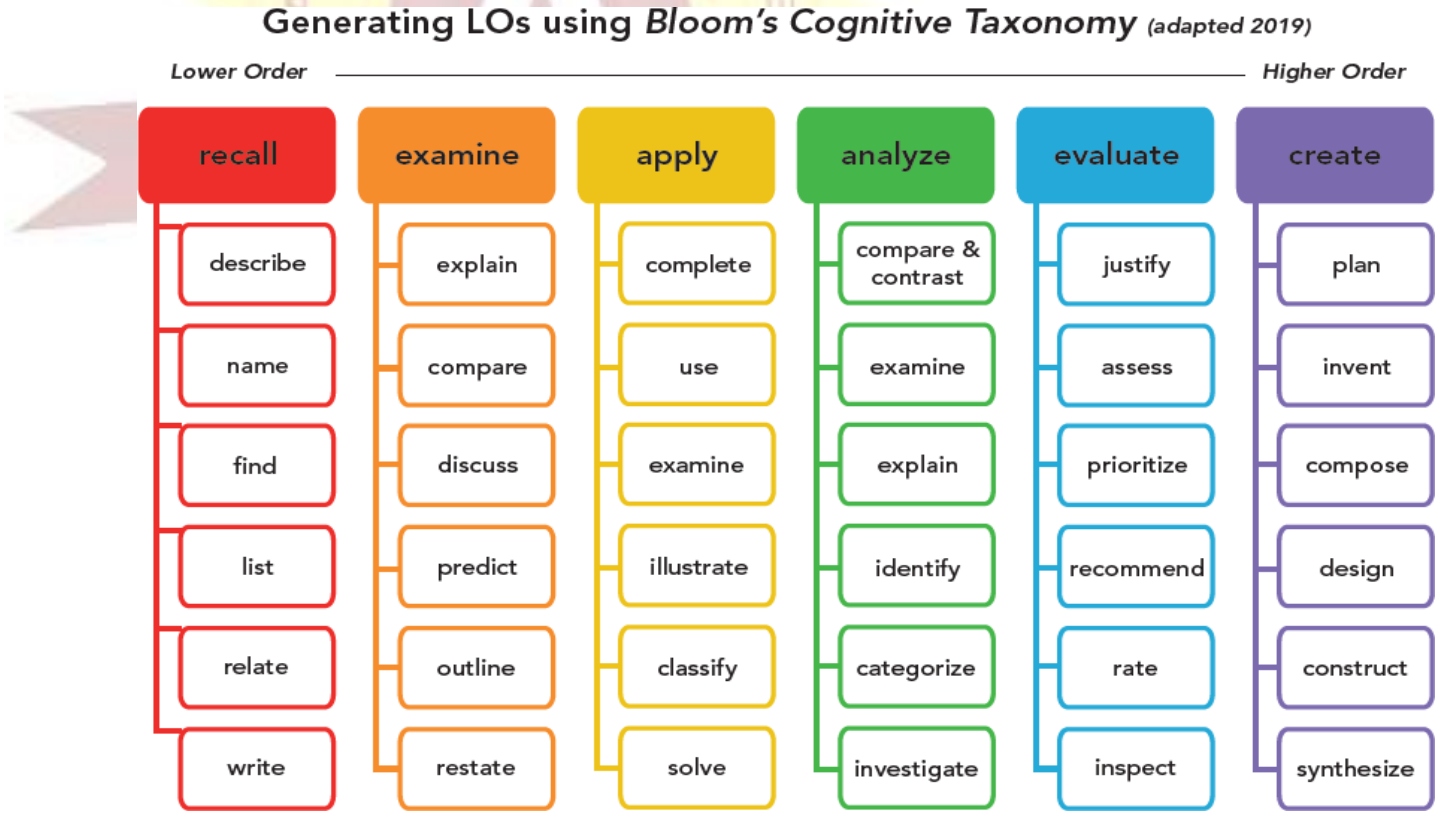

Fig. No. 1 Bloom's Taxonomy

STATEMENT OF COURSE OUTCOMES

Course Outcomes (COs):

It is the statement which indicates, that a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each module of a course. For every course, teacher may prepare six or less course outcomes. The keywords used to define COs are based on Bloom's Taxonomy.

Sample Statement:

Course: Biopharmaceutics and Pharmacokinetics

Course code: 8101T

Course Outcomes	After successful completion of course student will able to
1	Describe **[L2: Understanding]** the basic concept in Biopharmaceutics and its importance in dosage form design.
2	Know **[L3: Applying]** and understand the processes and terms related to the fate of drug in human body also explain and describe **[L1: Remembering]** the physicochemical, dosage form and patient related factors affecting absorption, distribution, metabolism and excretion of drugs.
3	Apply **[L3: Application]** the concept of compartment modelling and estimate [**L5: Evaluating]** the quantity/concentration of drug in body at any point of time.
4	Describe **[L1: Remembering]** and evaluate **[L5: Evaluating]** bioavailability, bioequivalence and its regulatory requirements for conducting bioequivalence study, bio-waivers, bio- similar. Identify **[L2: Understanding]** pharmacokinetic parameters in non-linear pharmacokinetics also understanding [**L2: Understanding]** of BCS (Biopharmaceutical classification system) theories of dissolution, dissolution test apparatus and IVIVC.
5	Apply **[L3: Application]** Pharmacokinetics in Clinical Situations.

Table No. 1 Course Outcomes of Biopharmaceutics

CO-PO-PSO MAPPING

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO- PSO matrix as shown below. The various correlation levels are:

"1" – Slight (Low) Correlation

"2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

"0" indicates there is no correlation.

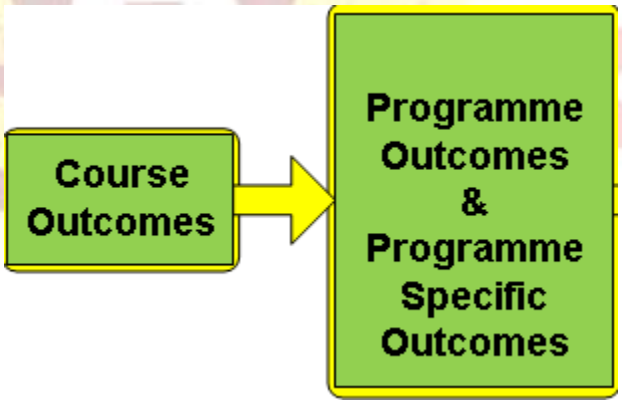

Fig. No. 2 Relation of Outcomes (CO-PO&PSO)

PROCESS INVOLVED IN CO-PO-PSO MAPPING

After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure given below. After writing the CO statements, CO will be mapped with PO. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual student's extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the eighth semester. The Program coordinator has to evaluate the PO attainment of individual student through direct and indirect method after the student completing their program attainment of individual student through direct and indirect method after the student completing their program.

SAMPLE OF CO-PO-PSO MAPPING
Subject: 8101 Biopharmaceutics

CO-PO-PSO MAPPING															
Mapping of Course Outcome (CO) with Program Outcome (PO) Programe Specific Outcome (PSO)															
CO/PO /PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	0	0	0	1	3	0	0	3	1	2	1	2
CO2	3	2	3	0	0	0	1	3	0	0	3	2	2	1	2
CO3	3	2	3	1	0	0	1	3	0	0	3	2	2	1	1
CO4	3	2	3	2	0	0	1	3	0	0	3	1	1	2	1
CO5	3	2	2	2	0	0	1	3	0	0	3	1	1	1	1
CO6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table No. 2 CO-PO-PSO Matrix of Biopharmaceutics

ASSESSMENT PROCESS

CO-PO-PSO Assessment Process:

CO-PO-PSO assessment is done by direct assessment and indirect assessment. Direct assessment is based on Sessional and University Marks. Indirect assessment is done through Student Feedback and Student Exit Survey.

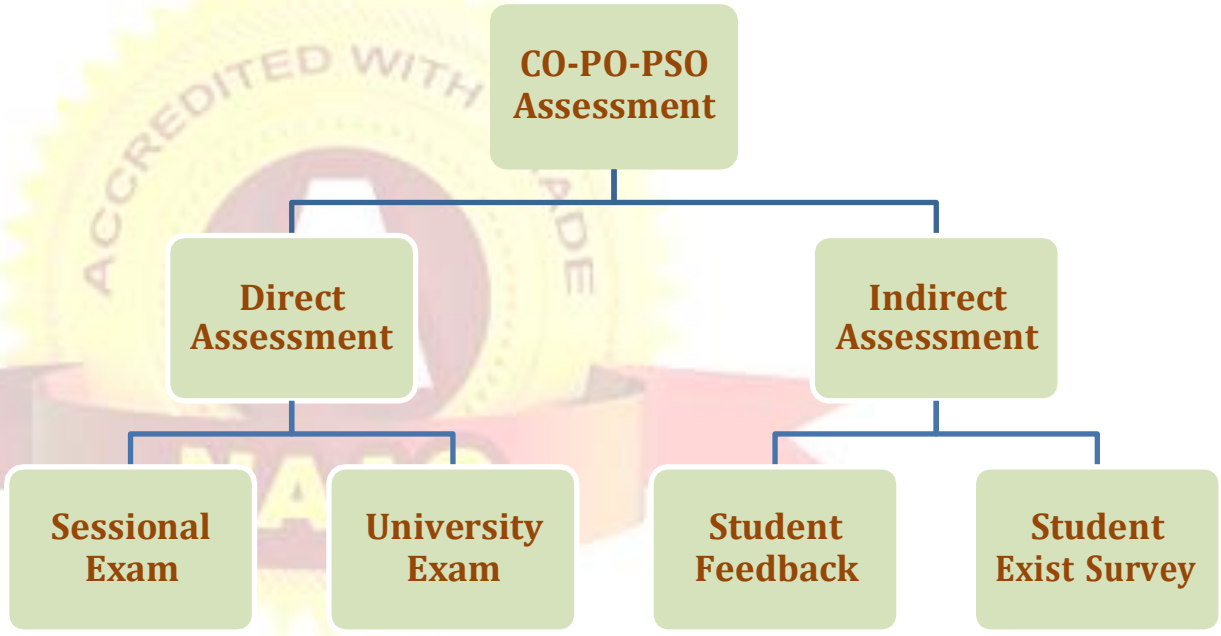

Fig. No. 3 CO-PO-PSO Assessment Process

A) DIRECT ASSESSMENT

Course Outcome is evaluated based on the performance of students in internal assessments and in university examination of a course.

The goal is set on the percentage of marks secured by the students for respective course. The marks assessment is done through levels as L1 (Low), L2 (Medium), L3 (High) for each year result. The levels are also applicable for Sessional Exam, and University Examination.

Attainment Level 1: Student score upto 59% to 55% marks in assessment.

Attainment Level 2: Student score upto 69% to 60% marks in assessment.

Attainment Level 3: Student score more than 70% marks in assessment.

PRES's College of Pharmacy (For Women), Chincholi									
Name of the Staff		Dr. R. T. Dolas		Name of the Department		P'ceutics	Course Code		8101
Class		Final Year B. Pharm					Name of the Subject		Biopharm
Academic Year 2015-16							Semester		VIII
Roll. No.	Name of the Students	Maximum	≥ 35	28-34	20-27	Maximum	≥ 18	14-17	10-13
		Marks 50	Level 3	Level 2	Level 1	Marks 25	Level 3	Level 2	Level 1
1	Abhale Swapnali Sanja	36	L3	0	0	21	L3	0	0
2	Avhad Arati Shantaram	23	0	0	L1	19	L3	0	0
3	Avhad Suvarna Madhuk	21	0	0	L1	19	L3	0	0
4	Manasi Hemant Awari	12	0	0	0	20	L3	0	0
5	Bagul Rashmi Arun	28	0	L2	0	20	L3	0	0
6	Beldar Jagruti Shriram	21	0	0	L1	16	0	L2	0
7	Bhalerao Jayashri Popa	22	0	0	L1	20	L3	0	0
8	Bhosale Shweta C.	20	0	0	L1	20	L3	0	0
9	Bornare Chaitali Baban	35	L3	0	0	21	L3	0	0
10	Bornare Priyanka Ragh	27	0	0	0	20	L3	0	0
11	Chaudhari Rohini Ramc	20	0	0	L1	14	0	L2	0
12	Chaudhari Rupali Sunil	22	0	0	L1	20	L3	0	0
13	Chavanke pratiksha sac	24	0	0	L1	18	L3	0	0
14	Dagale Gauri Panduran	38	L3	0	0	20	L3	0	0
15	Daware Kavita Tukaran	35	L3	0	0	20	L3	0	0
16	Daware Manisha valu	42	L3	0	0	19	L3	0	0
17	Daware Rupali Tanagi	21	0	0	L1	18	L3	0	0
18	Deore Mayuri Manohar	26	0	0	L1	19	L3	0	0

Table No. 3 Level Set as per percentage of Marks

Roll. No.	Name of the Students	Maximum Marks 50	Maximum Marks 25	Total Marks 75	% Marks
1	Abhale Swapnali Sanja	36	21	57	57
2	Avhad Arati Shantaram	23	19	42	42
3	Avhad Suvarna Madhuk	21	19	40	40
4	Manasi Hemant Awari	12	20	32	32
5	Bagul Rashmi Arun	28	20	48	48
6	Beldar Jagruti Shriram	21	16	37	37
7	Bhalerao Jayashri Popa	22	20	42	42
8	Bhosale Shweta C.	20	20	40	40
9	Bornare Chaitali Baban	35	21	56	56
10	Bornare Priyanka Ragh	27	20	47	47
11	Chaudhari Rohini Ramc	20	14	34	34
12	Chaudhari Rupali Sunil	22	20	42	42
13	Chavanke pratiksha sac	24	18	42	42
		Total Marks		2843	16
		Average Marks (Total Marks/No. of Students)		46.61	45
		% of Average Marks (Average Marks*100/Total Marks		62.14	61
		Goal Set for Next Year		62.14	

Table No. 3 Goal Set for respective Course

In direct assessment Sessional marks and University marks are equally distributed among Course Outcomes. The marks are given levels as stated above. Course attainment is calculated in percentage as per the levels.

$$\text{CO Attain in \%} = \frac{(L3*3+L2*2+L1*1)}{3}$$

Roll No.	Name of the Student	Sessional Marks	CO1	CO2	CO3	CO4	CO5	CO6	Marks Verified	Course Attainment					
		25	5.0	5.0	5.0	5.0	5.0	0	25	CO1	CO2	CO3	CO4	CO5	CO6
1	Abhale Swapnali Sanjay	21	4.2	4.2	4.2	4.2	4.2	0	21	L3	L3	L3	L3	L3	0
2	Avhad Arati Shantaram	19	3.8	3.8	3.8	3.8	3.8	0	19	L3	L3	L3	L3	L3	0
3	Avhad Suvarna Madhukar	19	3.8	3.8	3.8	3.8	3.8	0	19	L3	L3	L3	L3	L3	0
4	Manasi Hemant Awari	20	4.0	4.0	4.0	4.0	4.0	0	20	L3	L3	L3	L3	L3	0
5	Bagul Rashmi Arun	20	4.0	4.0	4.0	4.0	4.0	0	20	L3	L3	L3	L3	L3	0
6	Beldar Jagruti Shriram	16	3.2	3.2	3.2	3.2	3.2	0	16	L2	L2	L2	L2	L2	0
7	Bhalerao Jayashri Popat	20	4.0	4.0	4.0	4.0	4.0	0	20	L3	L3	L3	L3	L3	0
8	Bhosale Shweta C.	20	4.0	4.0	4.0	4.0	4.0	0	20	L3	L3	L3	L3	L3	0

	CO1 Attained	CO2 Attained	CO3 Attained	CO4 Attained	CO5 Attained	CO6 Attained
Level 3	44	44	44	44	44	0
Level 2	11	11	11	11	11	0
Level 1	6	6	6	6	6	0
Total No. of Students	61	61	61	61	61	0
Total L3 in %	72.13	72.13	72.13	72.13	72.13	#DIV/0!
Total L2 in %	18.03	18.03	18.03	18.03	18.03	#DIV/0!
Total L1 in %	9.84	9.84	9.84	9.84	9.84	#DIV/0!
Total % (L3 To L1)	100	100	100	100	100	#DIV/0!
CO- Attainment in % = (L3*3+L2*2+L1*1)/3	87.43	87.43	87.43	87.43	87.43	#DIV/0!

Table No.4 Course Attainment of Sessional Exam

The Course Attainment is mentioned as per value of goal according to 5% more or less. The value of goal with 5% more is given Exceed Expectation (EE) and 5% less is given below Expectation (BE) and goal attained is mentioned as Meet Expectation (ME).

Course attainment is decided as per the level of marks secured by students. CO attainment is then calculated in percentage considering all level.

Assessment Types	% of students Attained CO1	% of students Attained CO2	% of students Attained CO3	% of students Attained CO4	% of students Attained CO5	% of students Attained CO6
Internal Assessment (I)	60.38	60.38	60.38	60.38	60.38	0
University Assessment (U)	33.33	33.33	33.33	33.33	33.33	0.00
Direct Assessment (DA) =0.75*I + 0.25* U	53.62	53.62	53.62	53.62	53.62	0.00
Indirect Assessment (ID)	88.25	88.25	88.25	88.25	88.25	88.25
Total = 0.8*DA + 0.2*ID	60.54	60.54	60.54	60.54	60.54	17.65
Expectation w.r.t goal	ME	ME	ME	ME	ME	BE

Table No. 5 Course Attainment w.r.t. goal

The final attainment levels for each PO are calculated by summing up the 80 % weightage of Direct assessment correlation levels and 20 % of Indirect assessment correlation levels with respect to each course which is then averaged to obtain the attainment levels for the programme. The institute moving from traditional education to outcome based education. Finally attained the course outcomes to program outcomes and improved the performance of student.

Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3	PSO4
Direct (D)	1.8	1.1	1.6	1.0	0	0	0.6	1.8	0	0	1.8	0.8	1.0	0.7	0.8
Indirect (I)	2.6	1.6	2.3	1.5	0	0	0.9	2.6	0	0	2.6	1.2	1.4	1.1	1.2
Total=0.8*D+0.2*I	2.0	1.2	1.7	1.1	0.0	0.0	0.7	2.0	0.0	0.0	2.0	0.9	1.1	0.8	0.9
PO Attained	L	L	L	L	--	--	--	L	--	--	L	--	L	--	--

Table No. 6 Attainment of PO

B) INDIRECT ASSESSMENT

i) Student Feedback

Indirect assessment considers various tools implemented to achieve the POs by the students, the indirect assessment tools is Student feedback, correlation levels is defined as per Student feedback for each PO with respect to these indirect assessment tools.

$$\text{Indirect Assessment} = \frac{\text{CO-PO-PSO Level} * \% \text{ Feedback}}{100}$$

ii) Student Exit Survey

Student Exit Survey is conducted for the students who are graduated in that academic year. Relevant Questionnaires are presented in exit survey form to evaluate PO and PSO attainment.