The process for CO-PO attainment of the following academic batches-B.Pharm

(From R17onwards)

Note: The following CO-PO assessment methods are followed for all theory and practical courses of 2017-2021; 2018-2022; 2019-2023, 2020-2024, 2021-25 and 2022-26

I: CO attainment

All faculty members will prepare the average CO attainment percentage for their respective courses using the following methodology

➤ The evaluation of course outcome is based on the internal and external examination assessment.

The internal examination consists of mid examinations, assignments, practical mid examinations, seminars and project internal evaluation. The university external examination consists of Theory exam, practical exams and project viva voce.

The following procedure is used for CO attainment calculation:

CO Attainment based on University exam (CU)

For every theory course, 40% is taken as the bench-mark value. Number of students scoring more than the bench-mark value in each subject is used to compute the attainment level as defined below:

% of students >=bench mark	Attainment level
60	1
70	2
80	3

CO Attainment based on internal exam (CI)

Bench-mark value in each subject is taken as 50% and attainment is computed based on the number of students scoring more than the bench-mark value as defined below:

% students >=bench mark	Attainment level
60	1
70	2
80	3

29

3. Overall CO attainment:

80% weightage is given to University examination and 20% weightage to Internalexaminations.

Overall CO attainment = 0.8* CU + 0.2* CI

Table 1:

Programee: B.Pharmacy
Batch: 2017-21
Course/Code: POC-I(THEORY)/C211
Year: II Sem: I CO Max Marks
Section: "B" Q No

			CO1 (8.5M) Q1,4A (7.5M+2M)			CO2 (9.5M) 2A,2B,4B(7.5M+2M)			CO3 (6M) Q3(5M+1)			CO3 (6) 1a,1b (5M+1)				CO4 (9.5) Q2A,2B,4A (7.5M+2)			CO5 (9.5) 3A,3B,4B(7.5M+2)			OBJ I 10M	OBJ II 10M	ASS I 5M	ASS II 5M	JNTU 100
S.No	HT No	Name	Obt. Mar	Max Mar	%	Obt. Mar	Max Mar	%	Obt. Mar	Max Mar	%	Obt. Mar	Max Mar	%	CO3	Obt. Mar	Max Mar	%	Obt. Mar	Max Mar	%	Obt. Mar	Obt. Mar	Obt. Mar	Obt. Mar	Grade
1			2	8.5	23.529	6	9.5	63.158	1	6	16.67	5	6	83.33	50	2	9.5	21.05	4	9.5	42.11	8	5			
2			8.5	8.5	100	4.5	9.5	47.368	1	6	16.67	6	6	100.00	58.333	7	9.5	73.68	2	9.5	21.05	9	7			
3			4	8.5	47.059	8.5	9.5	89.474	1	6	16.67	1	6	16.67	16.667	6	9.5	63.16	7	9.5	73.68	6.5	5			
4			4.5	8.5	52.941	9.5	9.5	100	1	6	16.67	1	6	16.67	16.667	8.5	9.5	89.47	4.5	9.5	47.37	6	5			
5			6	8.5	70.588	2	9.5	21.053	5	6	83.33	1	6	16.67	50	8.5	9.5	89.47	4.5	9.5	47.37	6	4			
6			4	8.5	47.059	7	9.5	73.684	1	6	16.67	1	6	16.67	16.667	8.5	9.5	89.47	4.5	9.5	47.37	6	4			
7			6	8.5	70.588	7	9.5	73.684	1	6	16.67	1	6	16.67	16.667	9	9.5	94.74	4.5	9.5	47.37	6	4.5			
8			7	8.5	82.353	1.5	9.5	15.789	5	6	83.33	6	6	100.00	91.667	4.5	9.5	47.37	7	9.5	73.68	6.5	4			
9			7	8.5	82.353	1.5	9.5	15.789	6	6	100.00	6	6	100.00	100	4.5	9.5	47.37	4.5	9.5	47.37	6.5	5			
10			7	8.5	82.353	6.5	9.5	68.421	1	6	16.67	1	6	16.67	16.667	8.5	9.5	89.47	4.5	9.5	47.37	6.5	4			
11			7	8.5	82.353	6	9.5	63.158	1	6	16.67	1	6	16.67	16.667	6	9.5	63.16	7	9.5	73.68	6	5			
12			7	8.5	82.353	6	9.5	63.158	1	6	16.67	1	6	16.67	16.667	8.5	9.5	89.47	4.5	9.5	47.37	6	7			
13			3	8.5	35.294	5	9.5	52.632	1	6	16.67	1	6	16.67	16.667	6	9.5	63.16	4	9.5	42.11	6	4			
14			5	8.5	58.824	6	9.5	63.158	1	6	16.67	1	6	16.67	16.667	8.5	9.5	89.47	4.5	9.5	47.37	6	3			
15			6	8.5	70.588	1.5	9.5	15.789	5	6	83.33	1	6	16.67	50	6.5	9.5	68.42	4.5	9.5	47.37	6.5	4			
16			7	8.5	82.353	6	9.5	63.158	1	6	16.67	1	6	16.67	16.667	8.5	9.5	89.47	4.5	9.5	47.37	6	5			
17			7	8.5	82.353	6	9.5	63.158	1	6	16.67	1	6	16.67	16.667	8	9.5	84.21	4.5	9.5	47.37	6	4.5			
18			7	8.5	82.353	1.5	9.5	15.789	4	6	66.67	5	6	83.33	75	5	9.5	52.63	2	9.5	21.05	7.5	6			
19			5	8.5	58.824	6	9.5	63.158	1	6	16.67	1	6	16.67	16.667	6	9.5	63.16	6	9.5	63.16	5	4			
20			6	8.5	70.588	6	9.5	63.158	1	6	16.67	1	6	16.67	16.667	8.5	9.5	89.47	3.5	9.5	36.84	5	5			
21			4	8.5	47.059	4	9.5	42.105	1.5	6	25.00	1	6	16.67	20.833	5	9.5	52.63	2	9.5	21.05	5.5	5			
22			6	8.5	70.588	1.5	9.5	15.789	4	6	66.67	1	6	16.67	41.667	6	9.5	63.16	5.5	9.5	57.89	6.5	6.5			
23			8	8.5	94.118	4	9.5	42.105	1	6	16.67	1	6	16.67	16.667	8	9.5	84.21	4	9.5	42.11	7	6			
24			5	8.5	58.824	1.5	9.5	15.789	7	6	116.67	1	6	16.67	66.667	8	9.5	84.21	4	9.5	42.11	6.5	6			
25			4.5	8.5	52.941	2	9.5	21.053	1	6	16.67	1	6	16.67	16.667	6	9.5	63.16	3	9.5	31.58	5.5	7			
26			6	8.5	70.588	2	9.5	21.053	4	6	66.67	1	6	16.67	41.667	7	9.5	73.68	4.5	9.5	47.37	6	7.5			
27			6	8.5	70.588	2	9.5	21.053	5	6	83.33	1	6	16.67	50	6	9.5	84.21	4.5	9.5	47.37	7	8			

Table 2: CO attainment of selected course

Course code	Course name	Course outcomes	CO attainment from Internal exam assessment			CO attainment from University examination			CO Attainment (Internal+ University exam) A + B
			CO Attainment (%)	CO Attainment level (a)	A - Internal Exam attainment level (0.20*a)	CO Attainment (%)	CO Attainment level (b)	B - University Examinations attainment level (0.80*b)	
		CO1							
		CO2							
		CO3							
		CO4							
		CO5							
Overall CO attainment									

Note: 80% weightage to University examination and 20% weightage to Internal exams the attainment calculations will be (80% of University level) + (20% of Internal level).

II. PO attainment

- Step1: For each Programme Outcome the highest possible Blooms Knowledge level is assigned (PKL). For each course, course outcomes are drafted along with knowledge levels (CKL).

- Step 2: Course articulation matrix M(c, p) is defined as absolute value of the difference between CKL(c) – PKL(p).

$$M(c, p) = CKL \text{ value}(c) - PKL \text{ value}(p)$$

- Values of 0, 1 and 2 are considered as STRONG, 3,4are considered as MEDIUM,and5 is considered as LOW correlation.

- Based on the value, correlation value taken as Strong (S), Medium (M) or Low (L).

- In case, if a course correlates with Non-Cognitive PO correlation can be S, M and L depending on the course.

- For Non-cognitive POs (PO2, PO5 and PO8)**MEDIUM**correlation is suggested.

1. Fill Table 1 with CO no, course outcome and course outcomes knowledge level (CKL) of a particular course.

2. In **Table 2&3**, Fill CKL values and PKL values in respective columns.

3. In **Table 2**, Subtract CKL value(c) – PKL value(p) (Values of 0, 1 and 2 are considered as STRONG, 3,4 are considered as MEDIUM, and 5 is considered as LOW correlation).

4. Don't consider the sign value (+ or -). In case, if a course correlates with Non-Cognitive PO correlation can be S, M and L depending on the course.

5. Based on the value, correlation value taken as Strong (S), Medium (M) or Low (L) and fill the **Table 3.**

6. Then Fill **Table 4** with respective numerical values by considering Strong (S=3), Medium (M=2) and Low (L=1).

7. Calculate the sum of average of each CO contributing to PO and report in **Table 4. (B)**

8. All the faculty has to prepare the following tables for each course and submit to the respective batch in charges.

Table 1: Course Outcome of selected course

COURSE OUTCOMES:	At the end of the course, the student will be able to	
CO. No.	**COURSE OUTCOME**	**Course Outcomes Knowledge Level (CKL)**
C16.1	Explain the structure and activity of organic molecules, aliphatic hydrocarbons, alkenes and alkynes.	K2
C16.2	Explain about aromatic hydrocarbons and halogenatedarenes.	K2
C16.3	Summarize the nomenclature, preparation, characteristic reaction mechanisms of aliphatic halogen compounds alcohols, ethers and phenols.	K2
C16.4	Summarize the nomenclature, preparation, characteristic reaction mechanisms of carbonyl compounds, carboxylic acids and their derivatives.	K2
C16.5	Summarize the nomenclature, preparation, chemical reactivity and applications of nitrogen containing compounds.	K2

Table 2: Course articulation matrix of selected course

CO	CKL	PO1 (COG)	PO2 (NON-COG)	PO3 (COG)	PO4 (COG)	PO5 (NON-COG)	PO6 (COG)	PO7 (COG) & (NON-COG)	PO8 (NON-COG)	PO9 (COG)	PO10 (COG) & (NON-COG)	PO11 (COG)
PKL	→	K2	--	K4, K5	K5, K6	--	K2	K2(COG)	--	K3,K4,K5	K5 (COG)	K3
C16.1	K2	S(2-2=0)	--	S(4-2=2)	M(5-2=3)	--	S(2-2=0)	S(2-2=0)	--	S(3-2=1)	M(5-2=3)	S(3-2=1)
C16.2	K2	S(2-2=0)	--	S(4-2=2)	M(5-2=3)	--	S(2-2=0)	S(2-2=0)	--	S(3-2=1)	M(5-2=3)	S(3-2=1)
C16.3	K2	S(2-2=0)	--	S(4-2=2)	M(5-2=3)	--	S(2-2=0)	S(2-2=0)	--	S(3-2=1)	M(5-2=3)	S(3-2=1)
C16.4	K2	S(2-2=0)	--	S(4-2=2)	M(5-2=3)	--	S(2-2=0)	S(2-2=0)	--	S(3-2=1)	M(5-2=3)	S(3-2=1)
C16.5	K2	S(2-2=0)	--	S(4-2=2)	M(5-2=3)	--	S(2-2=0)	S(2-2=0)	--	S(3-2=1)	M(5-2=3)	S(3-2=1)

Table 3: Course Articulation Matrix of selected course

CKL (C16.1) – PKL (PO4) = -3
Defined COs KL is less than the
Expected PO KL
S: {-1}, M: {-2, -3}, L: {-4, -5}

	CKL	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
PKL		2	M	4	5	M	2	2	M	3	5	3
C16.1	2	S		S	M		S	S		S	M	S
C16.2	2	S		S	M		S	S		S	M	S
C16.3	2	S		S	M		S	S		S	M	S
C16.4	2	S		S	M		S	S		S	M	S
C16.5	2	S		S	M		S	S		S	M	S

CKL (C16.1) – PKL(PO1) = 0
Defined COs KL is equal to
Expected PO KL

CKL – Course outcome Knowledge level

PKL – Programme outcome Knowledge Level

PKL is expected by NBA

CKL is based on course outcome defined and approved by the Course Coordinator and Program Advisory Board

Table 4: Course Articulation Matrix (CO-PO Matrix) with numeric values

	CKL	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PKL		2	M	4	5	M	2	2	M	3	5
C16.1	2	3		3	2		3	3		3	2	3
C16.2	2	3		3	2		3	3		3	2	3
C16.3	2	3		3	2		3	3		3	2	3
C16.4	2	3		3	2		3	3		3	2	3
C16.5	2	3		3	2		3	3		3	2	3
C16 Average…(B)		3		3	2		3	3		3	2	3

From table 3 S, M &L are replaced by values i.e S=3, M=2& L=1

Step 3:Programme articulation matrix

Programme articulation matrix of all courses of academic batch is prepared by taking average correlation value of CO-PO matrix of respective course (Batch In charge has to prepare Programme articulation matrix of all courses of academic batch)

Table 5: Programme articulation matrix

Year/Sem	Course Name	Course Code	CO-PO Correlation value										
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11

Step 4: Direct attainment of POs

In Programme articulation matrix, Class average attainment level of respective course (A) is multiplied by Average correlation value of CO-PO matrix of respective course (B). The same method is adopted for all courses. It is explained in the following steps.

Example:

S. No.	Course name	Course code	No. of Students appeared	No of Students Passed	% of students >=bench mark	Attainment level
1.	DISPENSING AND GENERAL PHARMACY	C14	87	78	90	3—(A)

% of students who have secured greater than or equal tothe fixed bench mark (40%) in university examination is taken as Class average attainment level of respective course (A).

CO	CKL	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C14	Average	3	2	2	2	1	3	3	2	2.6	2	3 –(B)

Course Name	Course	CO-PO Correlation Matrix										
B.PHARMACY FIRST YEAR/I SEM	code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
DISPENSING AND GENERAL PHARMACY	C14	9	6	6	6	3	9	9	6	7.8	6	9..A*B

Batch in charge have to calculate direct attainment POs by following method.

The direct attainment of POs for all courses is determined by calculating weighted average using the following equation =

Average of {(A*B) of all courses}
Average correlation values of CO-PO matrix (B) of all courses

- From Direct PO attainment 80% weightage is taken.

Table 6: Direct attainment of POs

Course Name	Course Code	(A*B) of courses										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
Average of {(A*B) of all courses}												
Average correlation values of CO-PO matrix (B) of all courses												
DIRECT ATTAINMENT												
DIRECT ATTAINMENT (80%)												

Step 5: Indirect attainment of POs of all courses

Indirect attainment of POs is calculated by Programme exit survey, Alumni survey and Employer survey. From indirect PO attainment 20 % Weightage is taken which comprises of 10% of Programme exit survey, 05% Alumni survey and 05% Employer survey.

Table 7: In direct attainment of POs

Acade mic batch	Total Stud ents	Surve y Detai ls	Total No of Surve ys	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1
		PES												
Indirect attainment level														
		AS												
Indirect attainment level														
		ES												
Indirect attainment level														

Step 6: Overall PO attainment

From Direct PO attainment 80% weightage is taken. From indirect PO attainment 20 % weightage is taken which comprises of 10% of Programme exit survey; 5% Alumni survey and 5% of Employer survey. Overall weighted PO attainment is calculated by combining direct and indirect attainment levels.

Overall PO attainment= (Direct attainment level*0.8) + (PES attainment level*0.1+AS attainment level*0.05+ES attainment level*0.05)

Table 8: Over all PO attainment

PO ATTAINMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
DIRECT ATTAINMENT (80%)											
PROG EXIT SURVEY (10%)											
EMPLOYER SURVEY (05%)											
ALUMNI SURVEY (05%)											
OVERALL PO ATTAINMENT											

Step 7: Evaluation of POs

Expected level of attainment (**ELOA**) for Programme outcomes is analyzed and decided by PAB based on previous academic batches results and attainments. Actual level of attainment (**ALOA**) for Programme outcomes is reported.

Table 9: Over all PO attainment

PO	ELOA	ALOA
PO1		
PO2		
PO3		
PO4		
PO5		
PO6		
PO7		
PO8		
PO9		
PO10		
PO11		

PRINCIPAL