Dr. D. Y. Patil Educational Federation's

Dr. D. Y. PATIL COLLEGE

OF ENGINEERING & INNOVATION

Varale, Talegaon, Pune

OBE Philosophy & Implementation

Outline

- OBE Philosophy
- OBE V/S Traditional TLP
- OBE Model Hierarchy
- OBE Implementation
- Vision and Mission of the Institute & Department
- PEO, PO, PSO and CO
- Assessment Methodology
- CO-PO Mapping
- Calculation of Attainment of POs

OBE Philosophy

It's **not important**

what we teach,

but

it's **important**

what student

learn

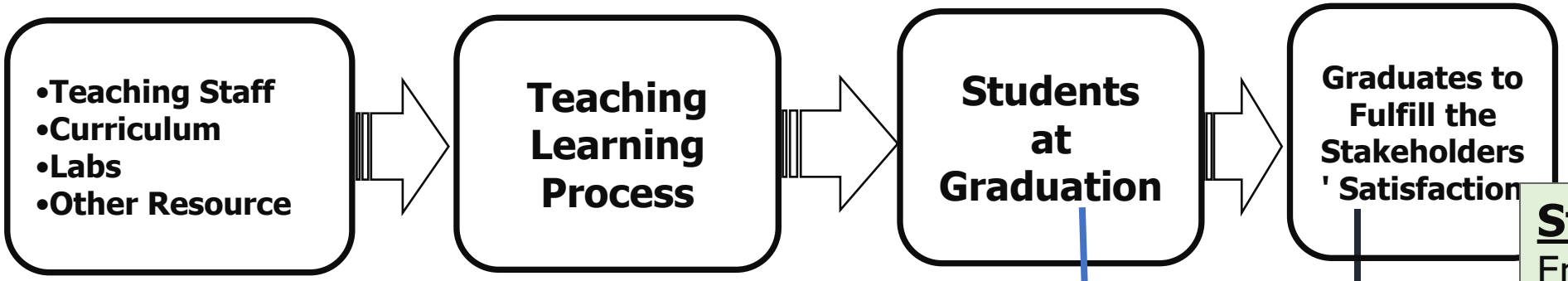
LEARNER-CENTRIC APPROACH

OBE Philosophy..

The model which we are using is in favor of making students demonstrate the SKILL to achieve required **Engineering Graduate Attributes**.

This OBE model sets clear standards for observable, measurable **outcomes**.

OBE v/s Traditional

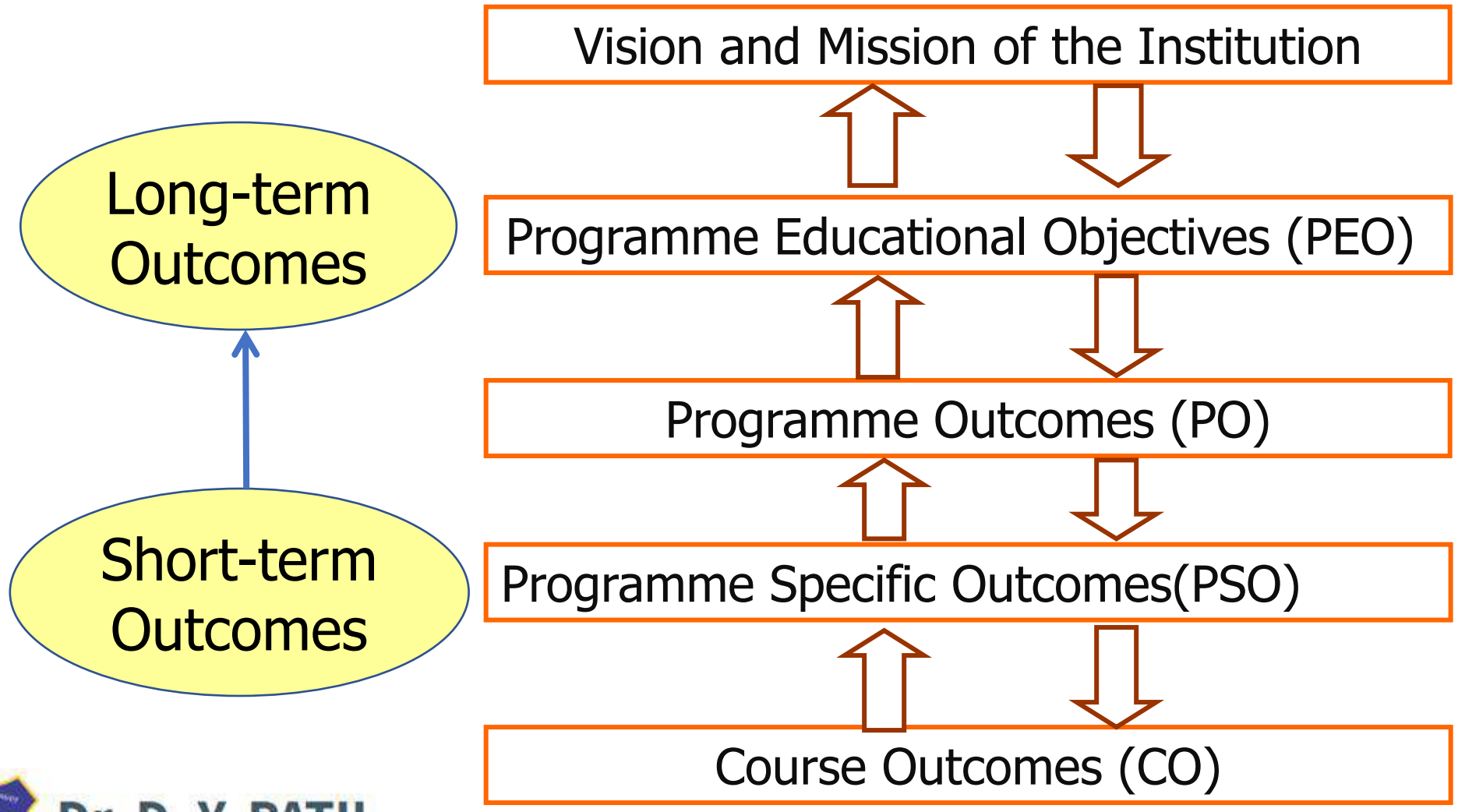


- Assessment mainly via exam, test, assignments.
- Quality control from teaching evaluation.

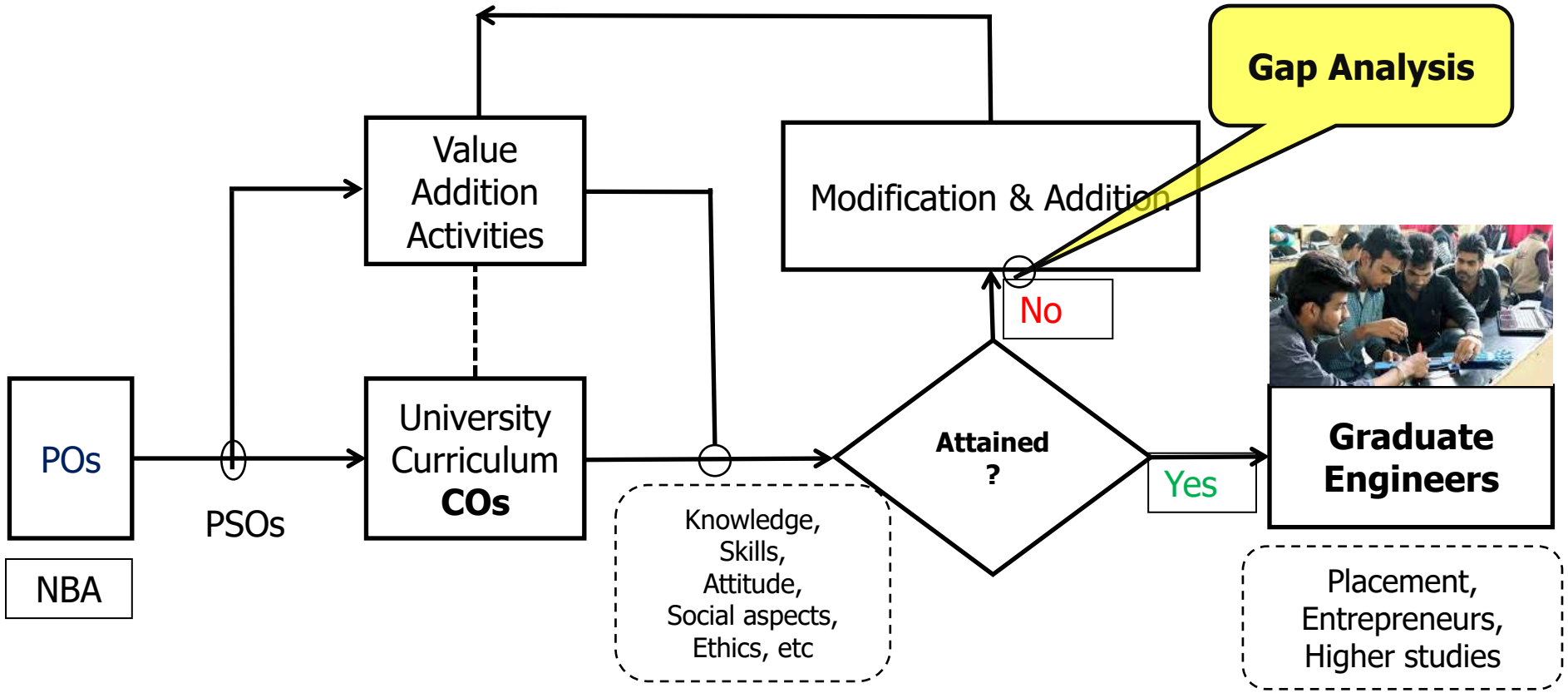
Stakeholders:
Employers
Industry Advisors
Academic Staff
Public and Parents
Alumni

- Assessment by exam, test and assignments.
- Assessment of teaching staff, lecture material & flow, results and student 'capabilities' (Short & long-term outcomes), lab interview, exit survey etc.
- More 'thinking' projects, with analysis.
- Feedback from industry, alumni and other stakeholders.
- Clear continuous improvement step.

Model Hierarchy of OBE



OBE Implementation



Our Vision and Mission

Vision

To achieve excellence in quality education through value based rapidly changing technologies and create technical Human-Resource with proficiencies of accepting new challenges.

Mission

Continuously strive to impart value-based education to elevate the satisfaction level of all stakeholders. Take dedicated efforts to create competent professionals by effective teaching learning process with passion of lifelong learning attitude.. Our endeavor is to promote and support innovative research, entrepreneurship and development activities through Industry Interaction.

OBE Objectives

Objective 1:

To prepare graduates to apply their knowledge to solve real life problems

Objective 2:

Induct Professionalism, Soft-Skills, Social Awareness, and Responsibilities among the Faculty and Students

Objective 3:

Inculcate the urge for life–long learning and Professional Ethics

Objective 4:

Motivate students and faculty for vertical growth and to understand new trends in Technologies

Our Program Educational Objectives (PEOs)

PEO1: Prepare graduates to apply their Computer Engineering knowledge while framing the solutions to the real-life problems

PEO2: Inculcate ability of communication, soft skills, ethics and work in a team while demonstrating the professionalism.

PEO3:Impart life-long learning among faculty and students to adapt new trends and technologies in the field of Computer Engineering.

Graduate Attributes

- Graduate Attributes which form the student learning outcomes w. r. t. :

1. Engineering Knowledge
2. Problem Analysis
3. Design/Development of solutions
4. Investigation
5. Modern tool usage

Technical

6. The Engineer and Society
7. Environment and sustainability
8. Ethics
9. Individual and Teamwork
10. Communications
11. Project Planning Management and Finance
12. Life-Long Learning

Non-Technical

PSOs

PSOs are a statement that describes what students are expected to know and be able to do in a specialized area of discipline upon graduation from a program.

They are beyond POs. Program Curriculum and other activities during the program must help in the achievement of PSOs along with POs

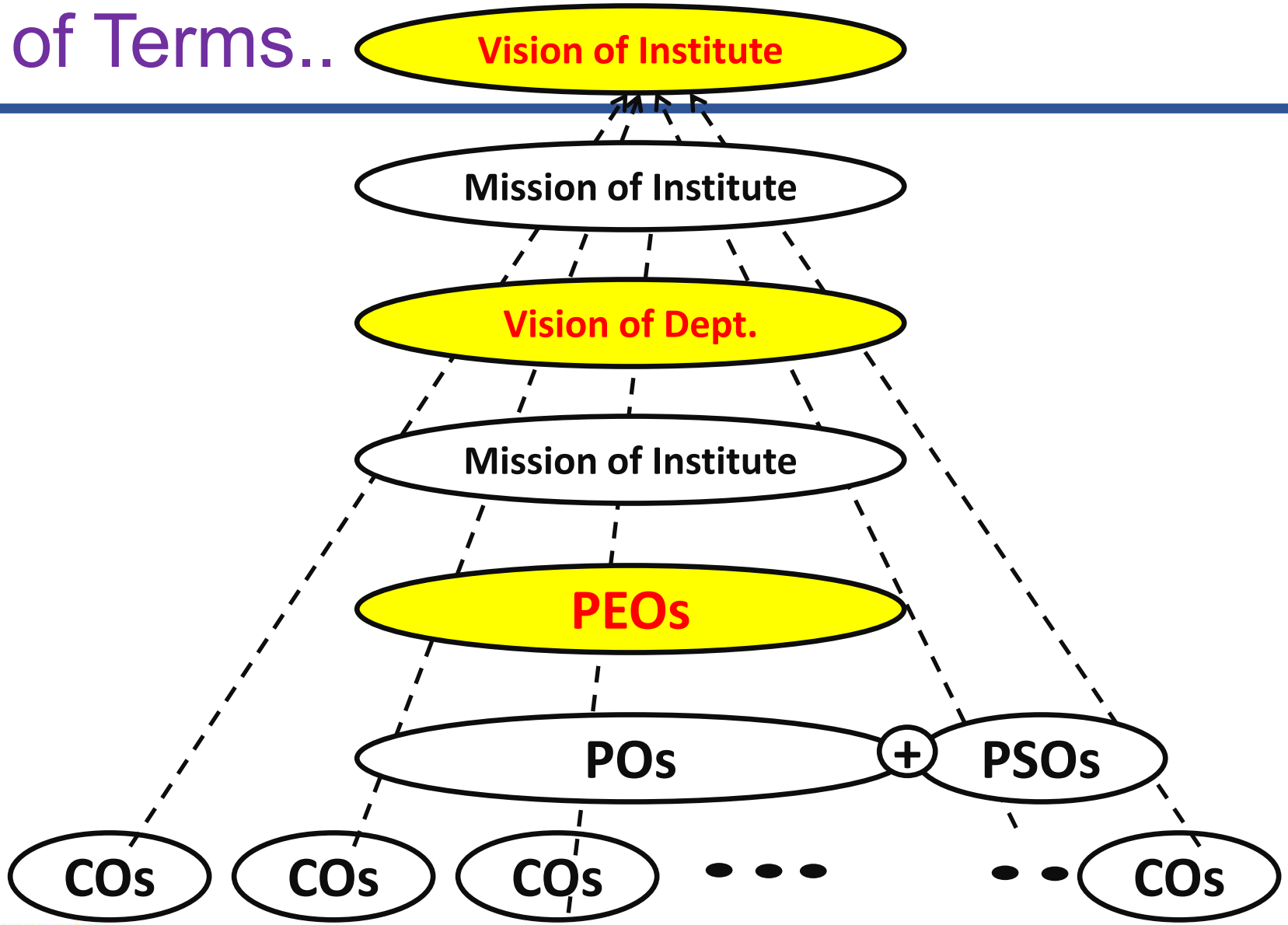
PSOs.. of Department of Computer Engineering

PSO1: Enhance the ability of design and develop algorithms while studying core courses consisting of concepts of Computer Network, Databases, System Programs, Software Testing and quality assurance.

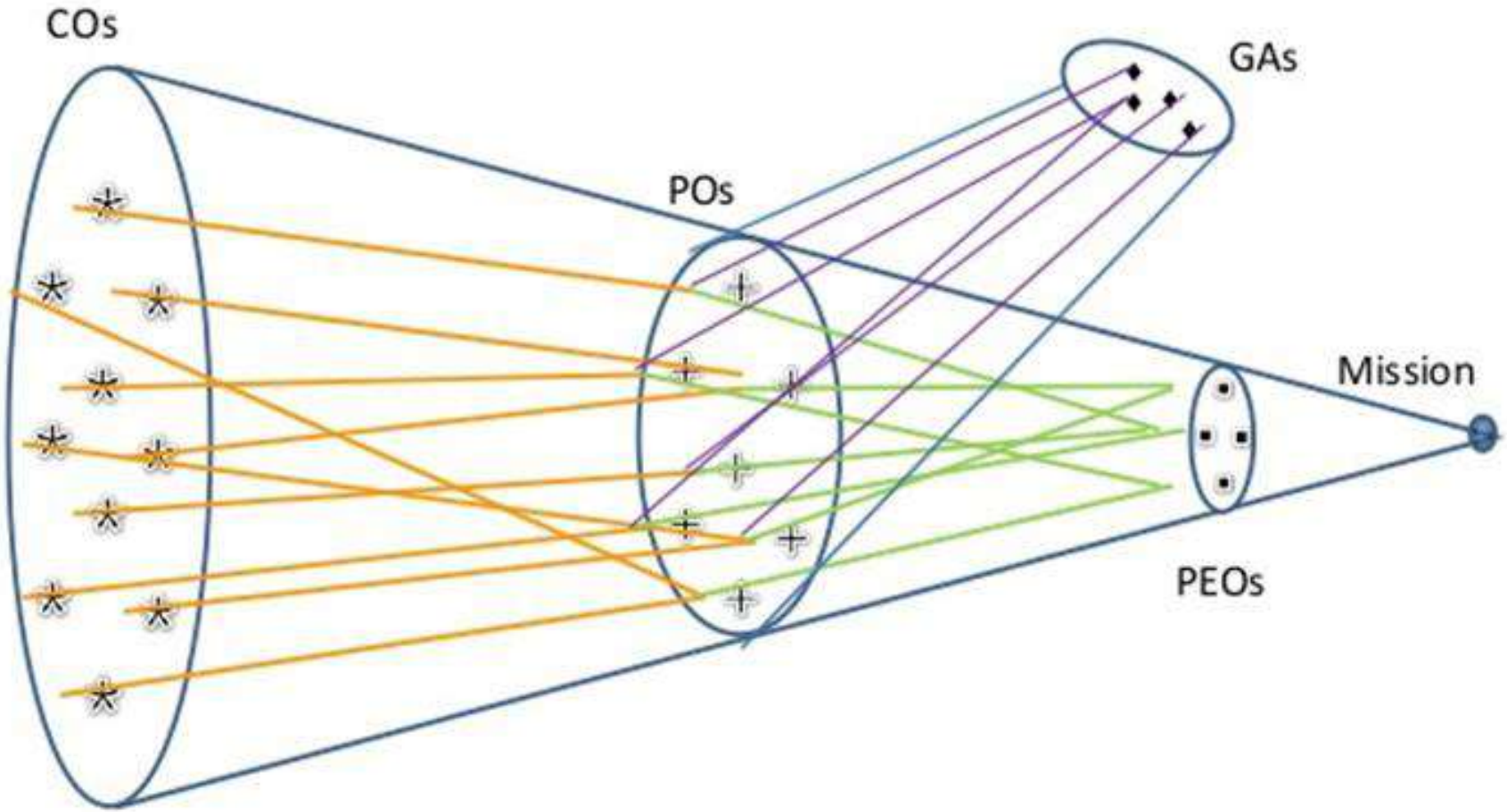
PSO2: Rigorous hand-on training to enhance the skills in emerging trends and technologies such as WSN, IoT, Machine Learning and Information Security.

PSO3: Inculcate professionalism with ethics and compassion towards humanity while working in a team.

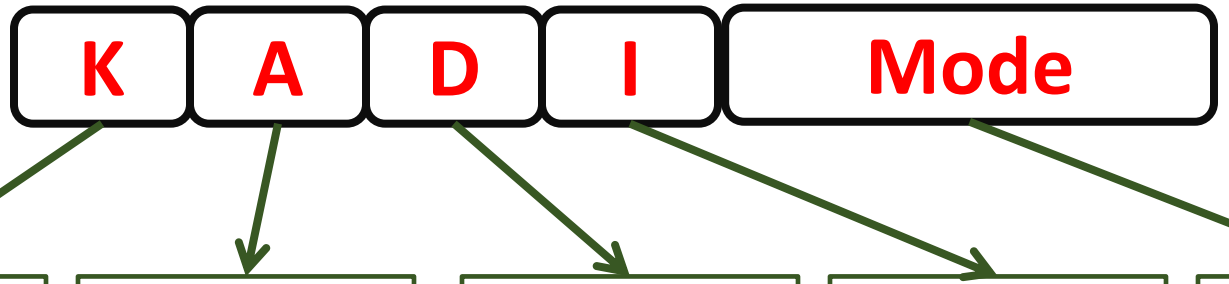
Hierarchy of Terms..



Hierarchy of Terms..



POs



Knowledge,
Apply knowledge of mathematics, science, engineering fundamentals and specialization to the solution of complex engineering problems.

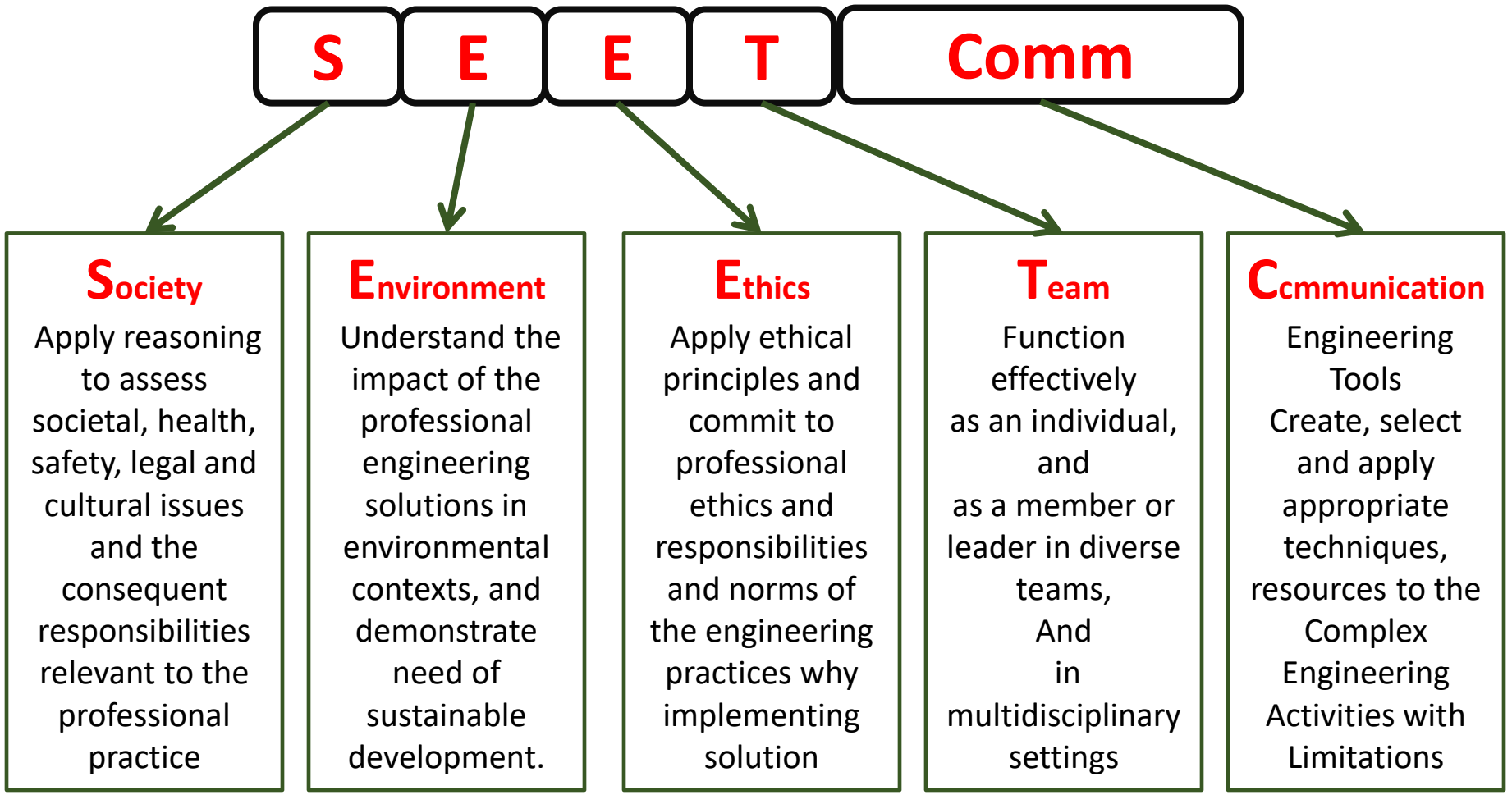
Analyze
Complex Engineering problem By Identifying , formulating the literature and reaching to the conclusion using principles of Science

Design
Solutions for complex problems . design systems, or processes that meet specified needs by considering safety, cultural, societal, and environment

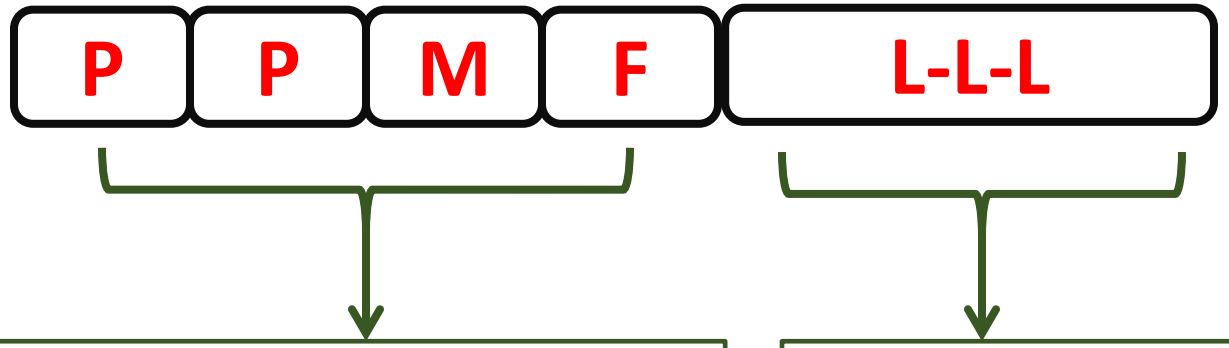
Investigate
Complex problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions

Modern
Engineering Tools Create, select and apply appropriate techniques, resources to the Complex Engineering Activities with Limitations

POs


S
E
E
T
Comm
Society
Apply reasoning to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice
Environment
Understand the impact of the professional engineering solutions in environmental contexts, and demonstrate need of sustainable development.
Ethics
Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices why implementing solution
Team
Function effectively as an individual, and as a member or leader in diverse teams, And in multidisciplinary settings
Ccmmunication
Engineering Tools Create, select and apply appropriate techniques, resources to the Complex Engineering Activities with Limitations

POs


P
P
M
F
L-L-L
Project Planning, Management & Finance
Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments including financial management
Life – Long-Learner
Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COs

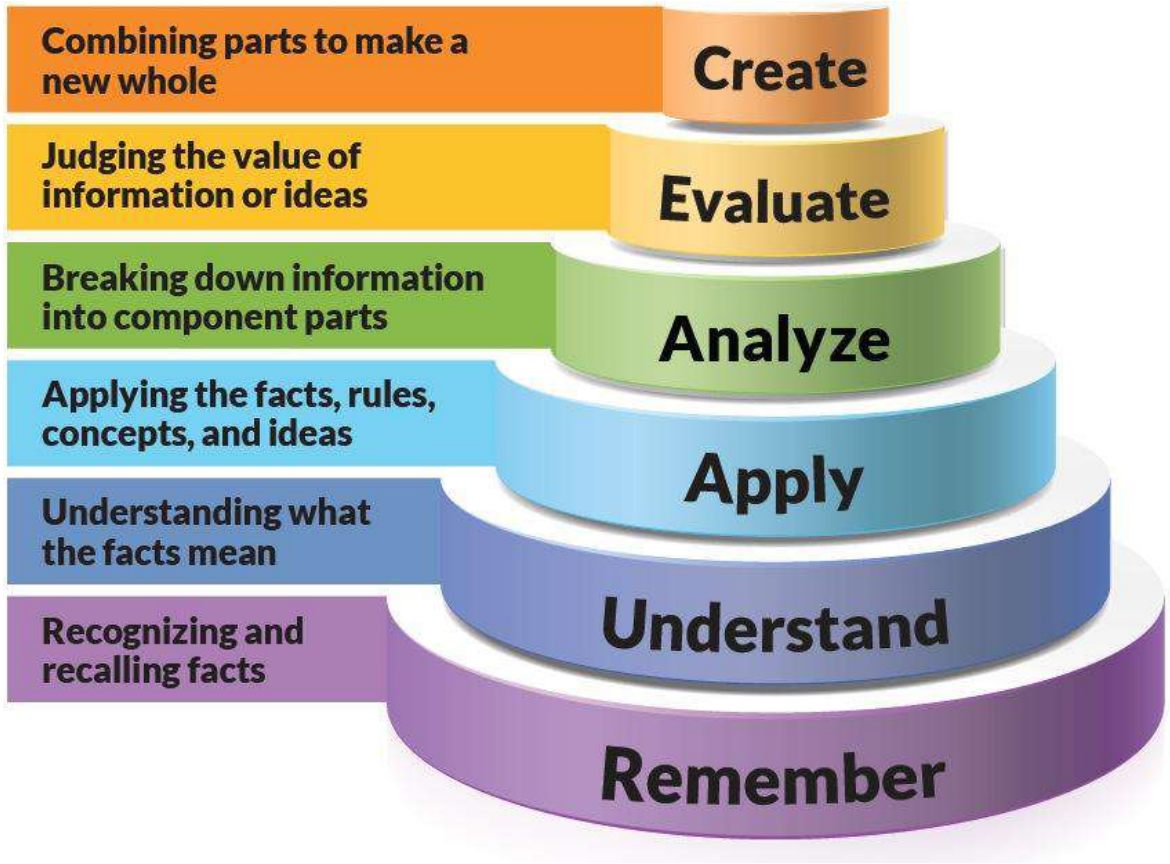
Learning outcomes or COs are goals for student learning that you, as a faculty, set for your course.

They essentially answer the question "What will students learn?"

Course-level or semester-long learning outcomes are usually shared with students in the syllabus.

Bloom's Taxonomy

L6	C
L5	E
L4	A
L3	A
L2	U
L1	R



PO-CO and Bloom's Taxonomy

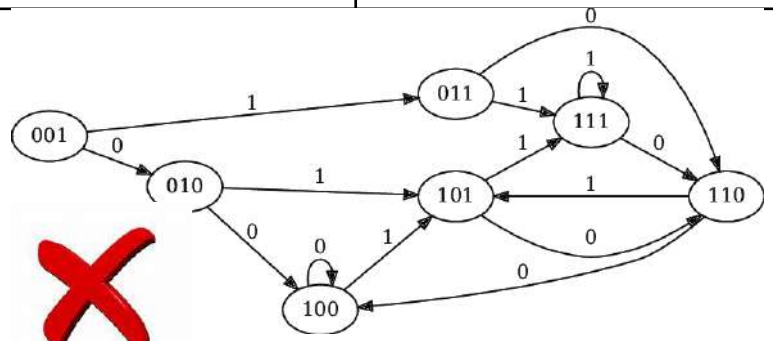
Type	Pos	Pos action Verbs	Pos Blooms Levels	COs Bloom's Level(s)
Technical Skills	PO1	Apply	L3	L1 to L4 »»» Theory Courses, L1 to L5 »»» Laboratory Courses, L1to L6 »»» Mini Project and Major Project
	PO2	Identify	L2	
		Formulate	L6	
		Review	L2	
	PO3	Design	L3, L6	
		Develop	L3, L6	
	PO4	Analyze	L4	
		Interpret	L2, L3	
		Design	L6	
	PO5	Create	L6	
		Select	L1, L2, L6	
		Apply	L3	
	PO6	Apply	L3	
		Assess	L5	
Transferabl eSkills	PO7	THUMB RULE If L1 Action Verbs of a CO »»» Correlates with anyof PO7 to PO12 »»» then assign 1 If L2 to L3 Action Verbs of a CO »»» Correlates with any		
	PO8			
	PO9			
	PO10			
	PO11			

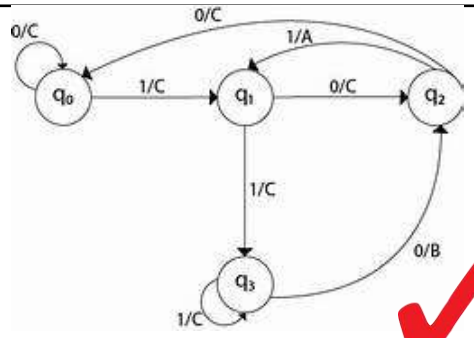
Bloom's Taxonomy – L6

Bloom's Level	Key Verbs (keywords)	Example Learning Outcome
Create	**design**, formulate, build, invent, create, compose, generate, derive, modify, develop.	*By the end of this lesson, the student will be able to **design** Digital Counter to count the number of products passing on the Conveyer belt.*

Bloom's Taxonomy – L5

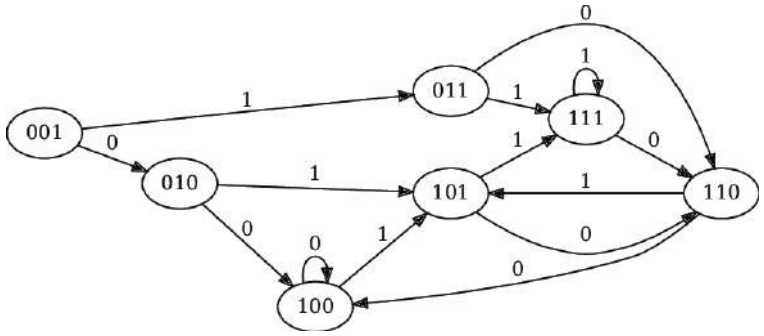
Bloom's Level	Key Verbs (keywords)	Example Learning Outcome
Evaluate	choose, support, relate, **determine,** defend, judge, grade, compare, contrast, argue, justify, support, convince, select, evaluate.	By the end of this lesson, the student will be able to **determine** whether use Mealy Machine Concept while designing the counter would be **more appropriate** for solving a dynamics problem.

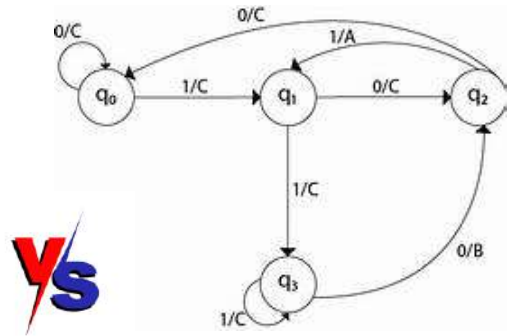




Bloom's Taxonomy – L4

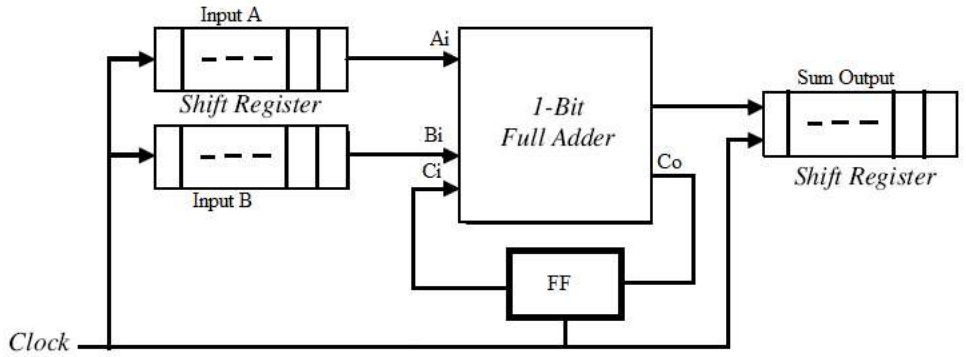
Bloom's Level	Key Verbs (keywords)	Example Learning Outcome
Analyze	classify, break down, categorize, analyze, diagram, illustrate, criticize, simplify, associate.	By the end of this lesson, the student will be able to **differentiate between** Moore and Mealy Machine.





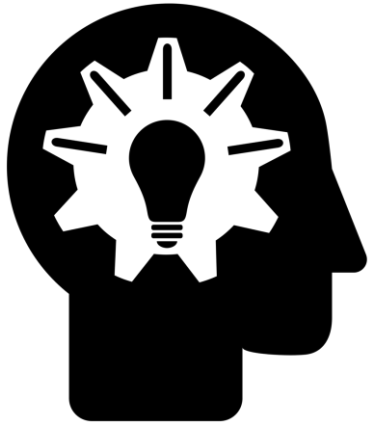
Bloom's Taxonomy – L3

Bloom's Level	Key Verbs (keywords)	Example Learning Outcome
Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, perform, present.	By the end of this lesson, the student will be able to calculate the delay involved in getting the final output count.



Bloom's Taxonomy – L2

Bloom's Level	Key Verbs (keywords)	Example Learning Outcome
Understand	describe, explain, paraphrase, restate, give original examples of, **summarize**, contrast, interpret, discuss.	By the end of this lesson, the student will be able to **summarize** the concept of Mealy and Moore Machine

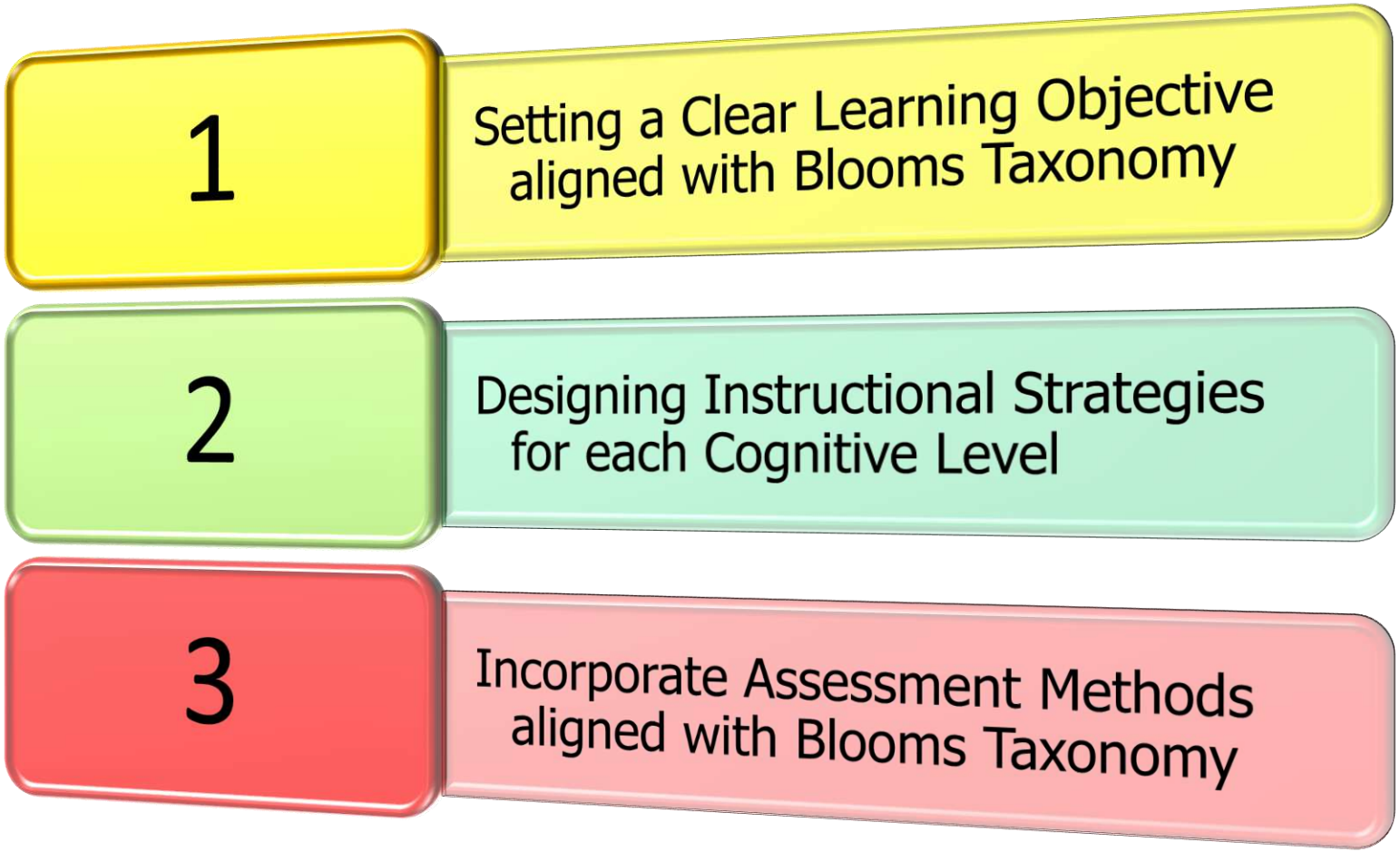


Bloom's Taxonomy – L2

Bloom's Level	Key Verbs (keywords)	Example Learning Outcome
Remember	list, recite, outline, define, name, match, quote, recall, identify, label, recognize.	By the end of this lesson, the student will be able to recite Newton's three laws of motion.

https://tips.uark.edu/using-blooms-taxonomy/

Three Main Components of Blooms Taxonomy



https://www.eklavvya.com/blog/blooms-taxonomy-outcome-based-education/

PO-CO and Bloom's Taxonomy

- **Select action verbs for a CO** from different Bloom's levels based on the importance of the particular CO for the given course.

- **Stick on to single action verbs while composing COs** and use for multiple action verbs if the need arises.

PO-CO and Bloom's Taxonomy

Values to CO-PO (technical Pos in particular) matrix are assigned by

- Judging the importance of the particular CO in relation to the Pos. If the CO **matches strongly with a particular PO criterion then 3** is assigned,

  if it matches moderately then 2 is assigned

  or **less than 1 is assigned**

  else marked with " – " symbol.

- **If an action verb used in a CO is repeated at multiple Bloom's levels, then reconsider which Bloom's level is the best fit for that action verb.**

CO-PO-PSO Attainment Calculations

Vision and Mission of the Institute 1

PEOs 2
Program Educational Objectives

3 **POs and PSOs**
Program Outcomes and Program Specific Outcomes

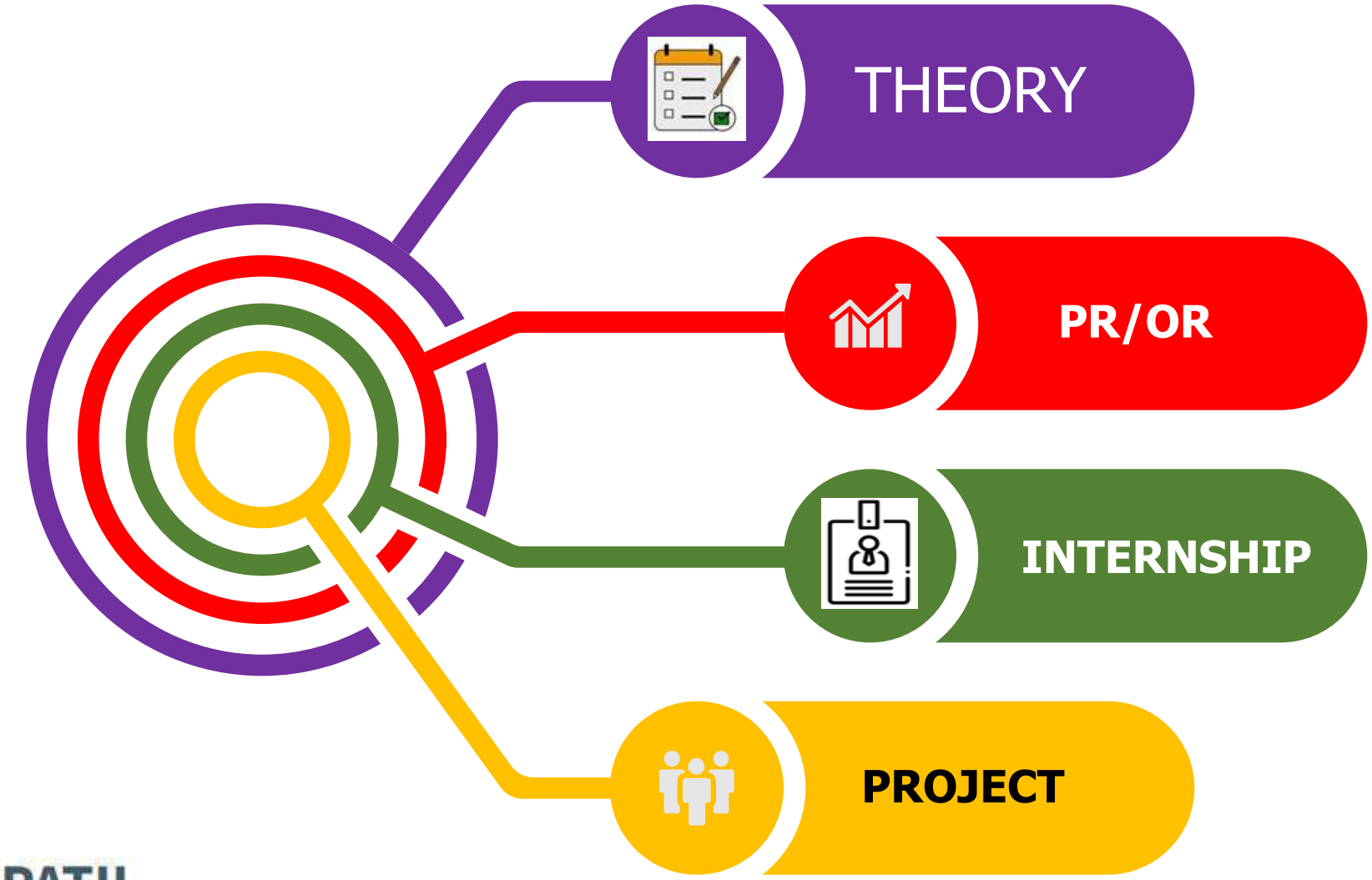
4 **COs**
Course Outcomes

Course Outcome (CO)

Course Outcomes are narrower statements that describe what students are expected to know, and are able to do at the end of each course.

These relate to the skills, knowledge and behavior that students acquire in their progress through the course.

Types of Course Outcome (CO)

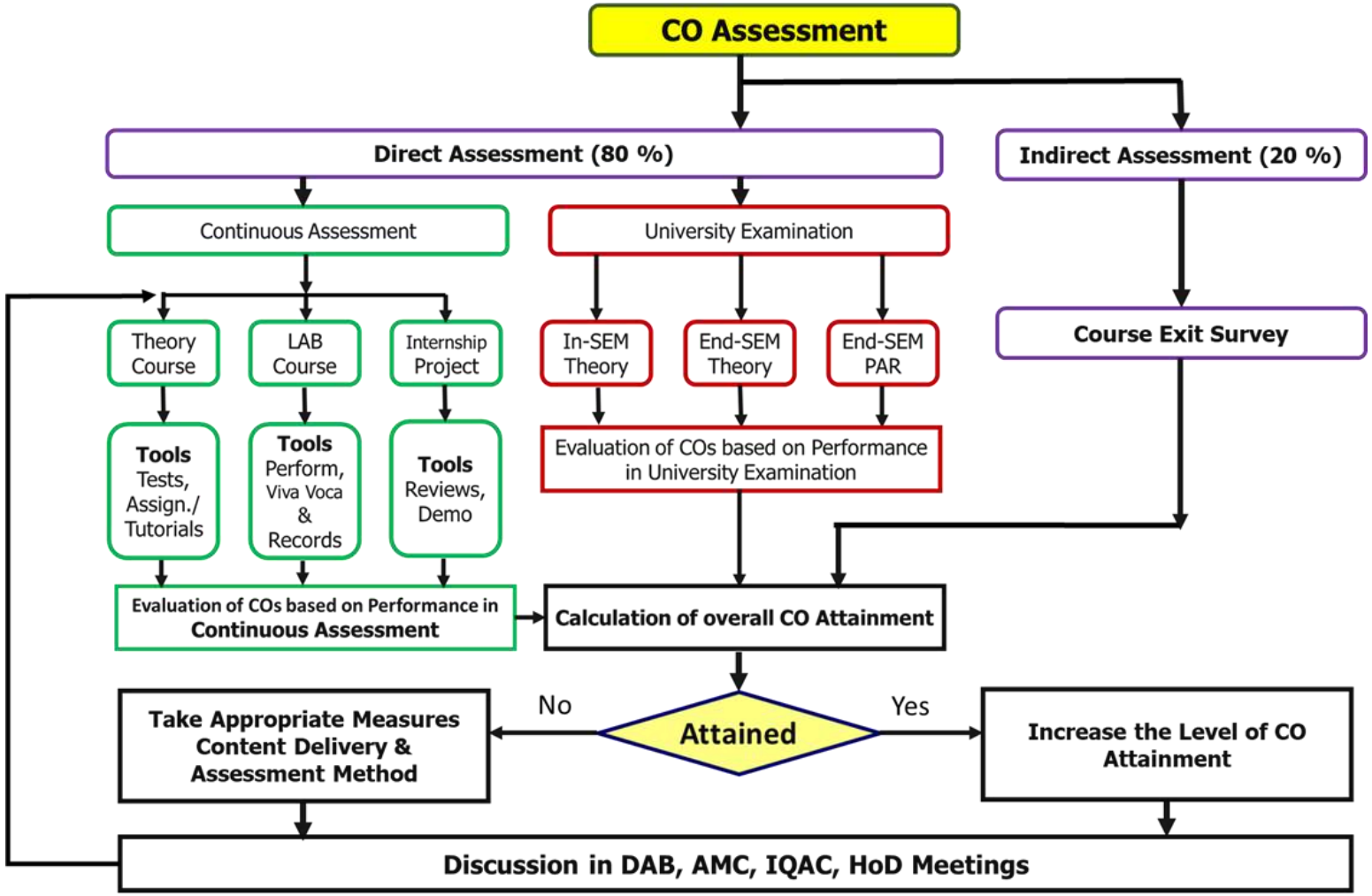


Course Outcome (CO)

Course Outcome

CO Number	On completion of this course, students will be able to:	Cognitive Level
CO1		
CO2		
CO3		
CO4		
CO5		
CO6		

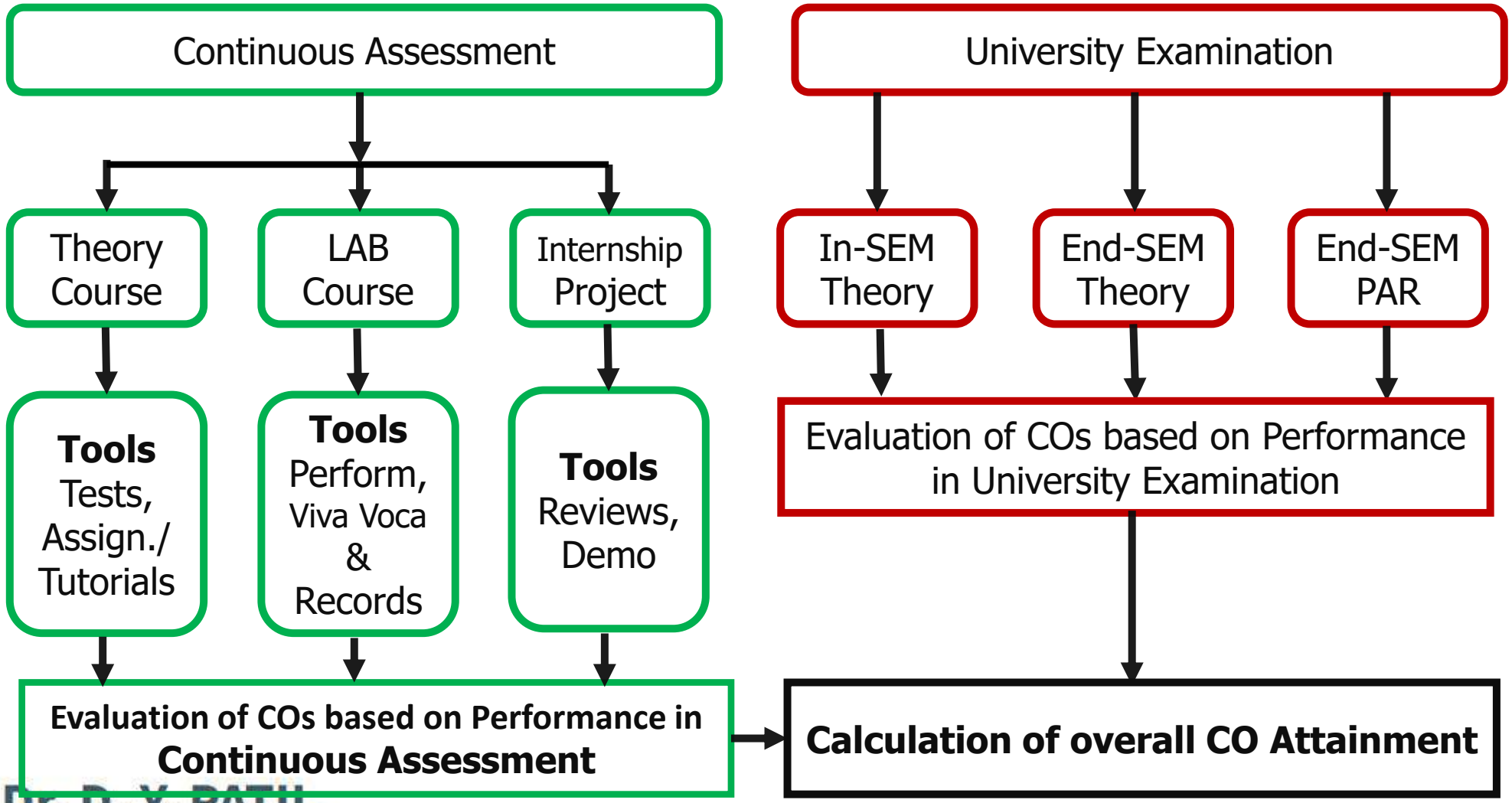
CO assessment



CO Assessment Tools

Evaluation Tools	Process
Assignments & Tutorials	The Tests and assignments are given to the students. Tests and Assignment sheets are prepared by the faculty member with COs and levels.
University IN-SEM Examination	Mid-SEM Examination is conducted by SPPU with institute level assessment to evaluate the attainment of course outcomes. Each question is mapped with COs and blooms level.
Continuous Assessment & Model Exam (Laboratory Course)	The evaluation criteria for each experiment are based on performance, presentations, viva-voce and submission of Journals. The attainment of COs is calculated through continuous assessment and model practical performance.
Internship Reviews **Project Reviews**	Three reviews are conducted periodically to monitor and evaluate the progress of the project using project **rubrics.** Presentations and Viva-Voce is conducted at the end of the semester.
University End SEM Examination	At the end of each semester, final examination is conducted by SPPU for **Theory and Laboratory courses i**n which all the Cos are covered in the question papers.

CO Assessment Tools



CO-PO-PSO Mapping

CO-PO-PSO MAPPING

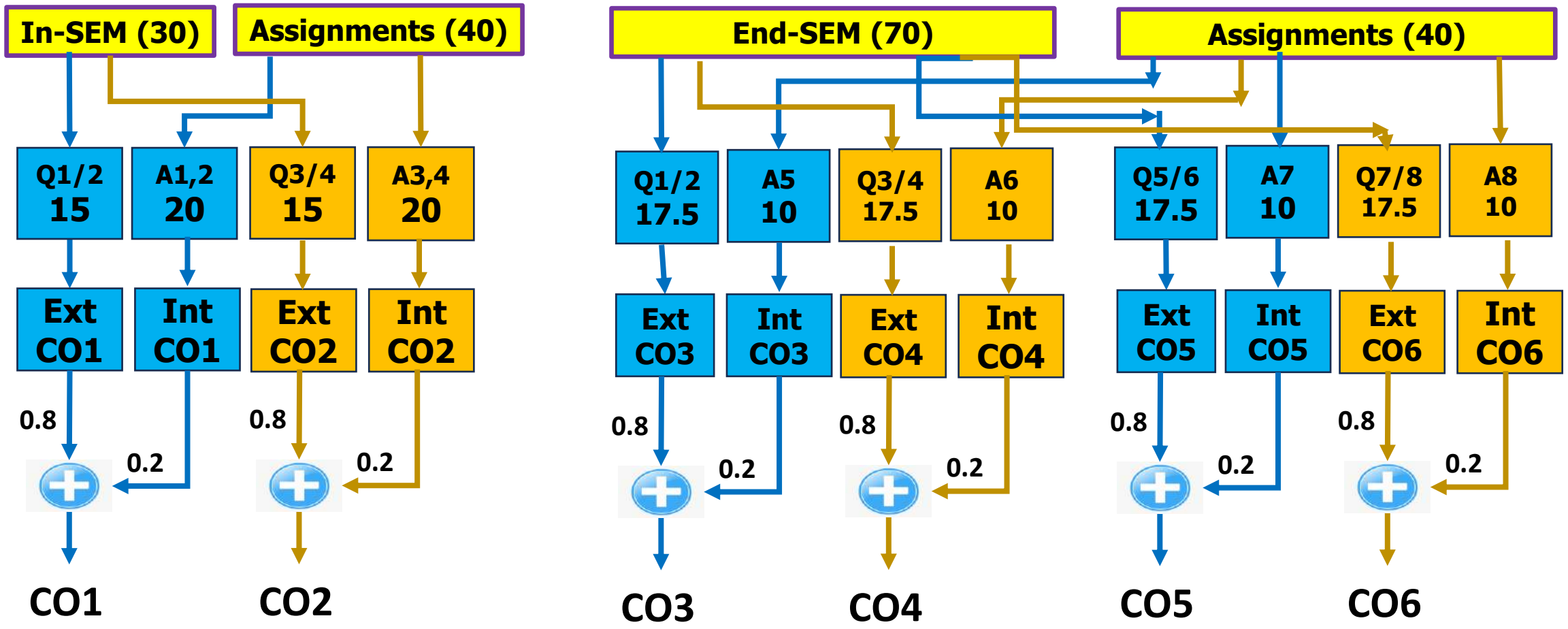
CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1															
2	CO2															
3	CO3															
4	CO4															
5	CO5															
6	CO6															

CO – PO Mapping (Matrix)

Depending upon the Contribution of the CO, there are **Three possible CO-PO Mapping levels**

Level of Attainment	Description towards Attainment
3	3-indicates Substantial **(high)** mapping (high contribution towards attainment)
2	2-indicates Moderate **(medium)** mapping (medium contribution towards attainment)
1	1-indicates Slight **(low)** mapping (some contribution towards attainment)
0	0-indicates Slight **(very low)** mapping (absolutely no contribution towards attainment)

CO Attainment Calculations



Theory

- Theory Examination
- In-SEM Assessment (30)
- End-SEM Assessment (70)
- Assignments/ Tests
- Continuous Assessment (80)

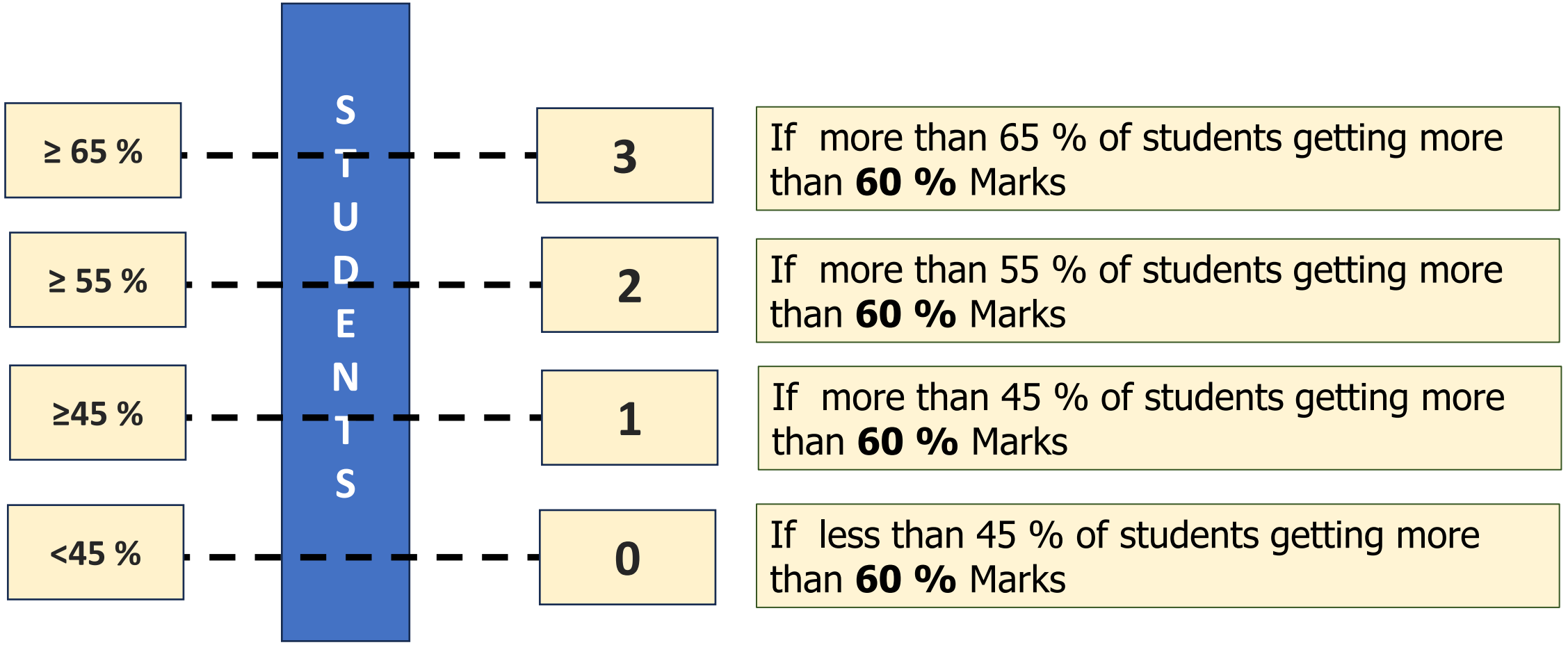
Practical

- Practical Assignments
- Continuous Assessment (40-60))
- Practical/Oral Examination
- Term-Work Mock/Oral (25/50)
- End-SEM Assessment (25/50)

CO Attainment Calculations Theory up to Mid-SEM

Roll Number	Name of Student	Insem Mark	Q1 (15) CO1	Q3 (15) CO2	Assignment-1 (10) CO1	Assignment-2 (10) CO1	Assignment-3 (10) co2	Assignment-4 (10) Co2	CO1 total (35)	CO2 total (35)	CO1	CO2
1		17	11	6	5	6	7	7	22	20	62.86	57.14
2		20	12	8	9	8	7	7	29	22	82.86	62.86
3		07	7	0	6	9	7	6	22	13	62.86	37.14
4		22	12	10	7	8	7	7	27	24	77.14	68.57
5		17	12	5	6	8	8	7	26	20	74.29	57.14
6		20	10	10	9	6	6	8	25	24	71.43	68.57
7		26	13	13	9	8	8	9	30	30	85.71	85.71
8		20	12	8	6	9	8	7	27	23	77.14	65.71
9		21	14	7	6	7	6	7	27	20	77.14	57.14
10		26	12	14	6	8	8	9	26	31	74.29	88.57
11		12	8	4	7	6	6	9	21	19	60.00	54.29
12		19	14	5	6	7	6	8	27	19	77.14	54.29
13		22	12	10	7	8	8	7	27	25	77.14	71.43
14		18	13	5	7	9	9	9	29	23	82.86	65.71

Attainment Levels Vs. Set Target (60 %):



CO Attainment Calculations Theory after ESE

Roll Number	Endsem Mark (70)	(17.5) CO3	(17.5) CO4	(17.5) CO5	(17.5) co6	Assignment-5 (20) CO3	Assignment-6 (20) Co4	Assignment-7 (20) CO5	Assignment-8 (20) CO6	CO3	CO4	CO5	CO6	CO3	CO4	CO5	CO6
1	47	11.75	11.75	11.75	11.75	7	8	8	7	18.75	19.75	19.75	18.75	68.18	71.82	71.82	68.18
2	34	8.5	8.5	8.5	8.5	7	7	7	7	15.5	15.5	15.5	15.5	56.36	56.36	56.36	56.36
3	39	9.75	9.75	9.75	9.75	6	6	6	7	15.75	15.75	15.75	16.75	57.27	57.27	57.27	60.91
4	54	13.5	13.5	13.5	13.5	5	8	7	6	18.5	21.5	20.5	19.5	67.27	78.18	74.55	70.91
5	44	11	11	11	11	7	6	7	6	18	17	18	17	65.45	61.82	65.45	61.82
6	45	11.25	11.25	11.25	11.25	6	7	6	8	17.25	18.25	17.25	19.25	62.73	66.36	62.73	70.00
7	49	12.25	12.25	12.25	12.25	8	7	7	8	20.25	19.25	19.25	20.25	73.64	70.00	70.00	73.64
8	45	11.25	11.25	11.25	11.25	8	8	7	7	19.25	19.25	18.25	18.25	70.00	70.00	66.36	66.36
9	40	10	10	10	10	6	6	7	7	16	16	17	17	58.18	58.18	61.82	61.82
10	42	10.5	10.5	10.5	10.5	5	7	8	8	15.5	17.5	18.5	18.5	56.36	63.64	67.27	67.27

PO Attainment Calculations

CO Attainment	
CO1	3
CO2	1
CO3	2
CO4	2
CO5	3
CO6	1

CO-PO-PSO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3	1	3										
CO2	2	3	3	1	2										
CO3	1	2	2	2	1										
CO4	3	1	1	2	1										
CO5	2	1		1											
CO6	1														

$$PO1 = \frac{3\times3 + 1\times2 + 2\times1 + 2\times3 + 3\times2 + 1\times1}{(3+2+1+3+2+1)}$$

$$PO2 = \frac{1\times3 + 2\times2 + 2\times1 + 3\times1}{(3+2+1+1)}$$

PO Attainment Calculations

CO-PO-PSO MAPPING

CO Attainment		CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2.76	CO1	2	2	3	1	-	-	-	1	-	-	-	3	3	2	-
CO2	2.37	CO2	-	2	3	-	-	1	-	-	-	-	-	3	3	3	1
CO3	1.91	CO3	-	2	3	-	2	-	-	-	-	-	-	3	3	2	-
CO4	1.93	CO4	2	2	2	2	-	-	-	-	-	1	-	3	3	2	-
CO5	1.88	CO5	-	2	3	-	-	-	-	-	-	-	1	3	3	3	1
CO6	1.92	CO6	2	2	-	-	-	-	1	-	2	-	1	1	3	2	-

$$PO1 = \frac{2.76\times2 + 1.93\times2 + 1.92\times1}{(2.76+2.33+1.91+1.93+1.88+1.92)}$$

$$PO2 = \frac{1\times3 + 2\times2+2\times1+3\times1}{(1+2+2+3)}$$

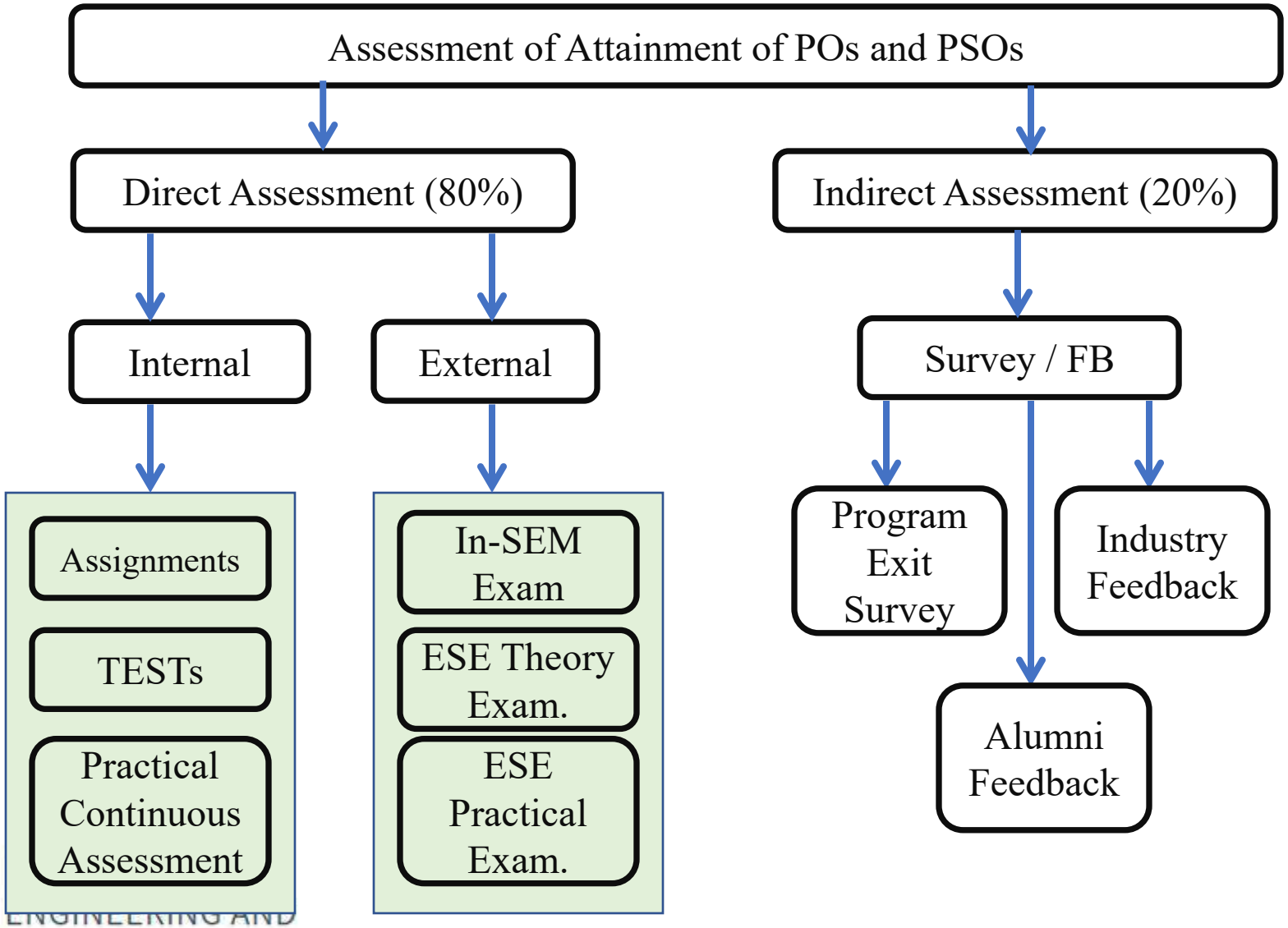
PO Attainment

- Direct attainment level of a PO & PSO is determined by taking average across all courses addressing that PO and/or PSO.

- Fractional numbers may be used for example 1.55.

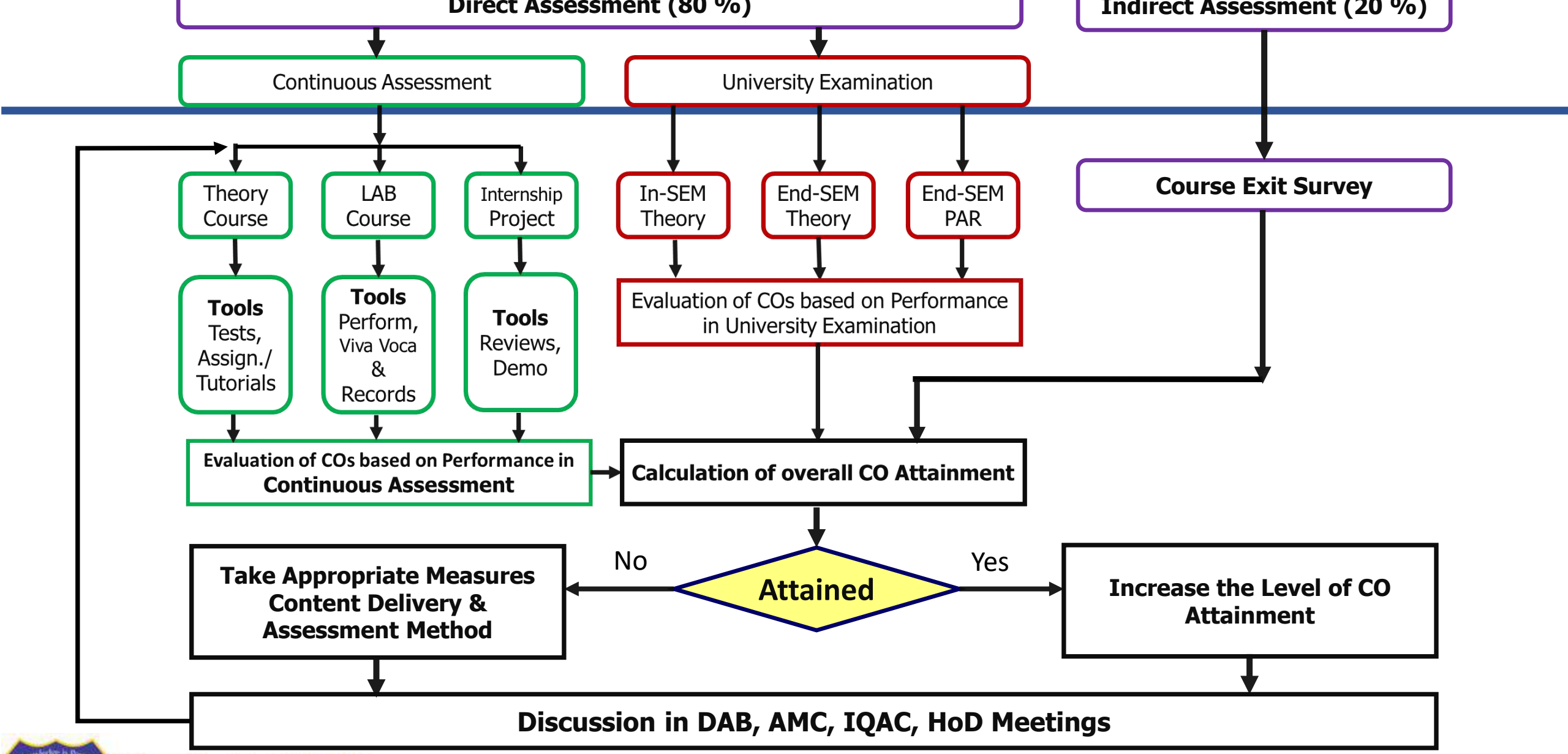
- Indirect attainment level of PO & PSO is determined based on the student exit surveys, employer surveys, co-curricular activities, extracurricular activities etc.

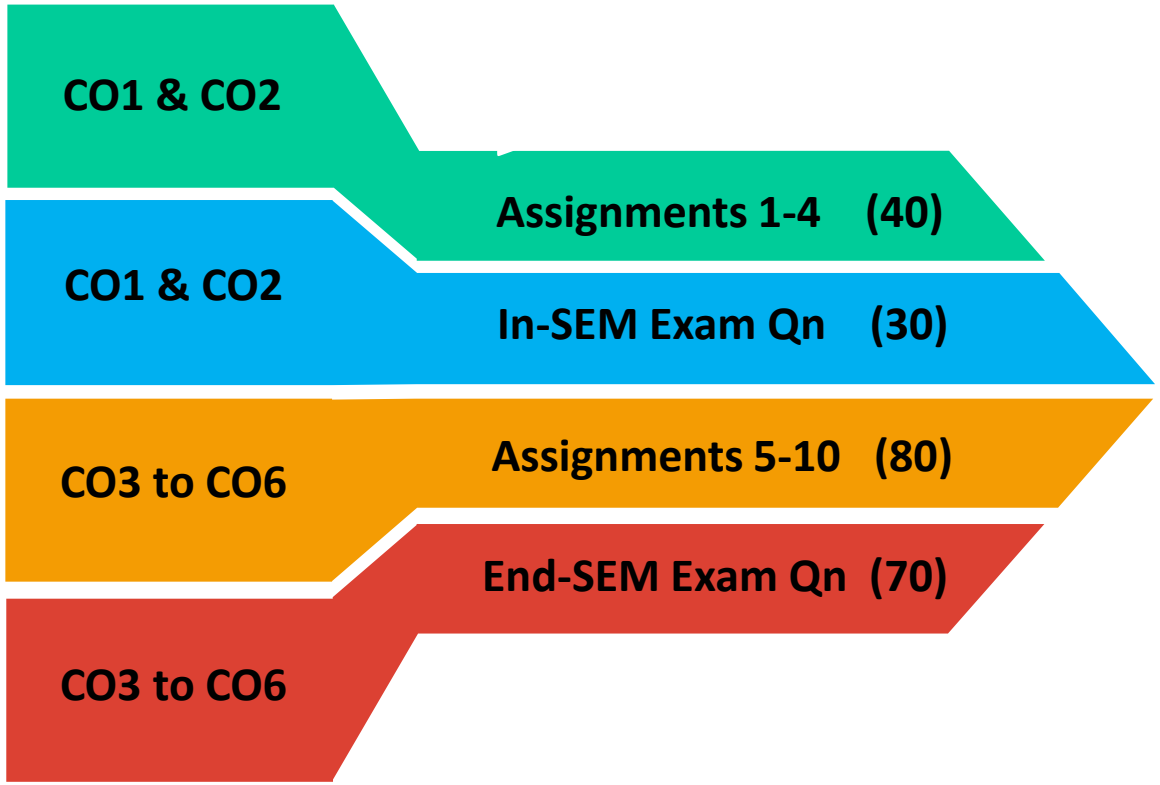
Processes of PO-PSO Attainment



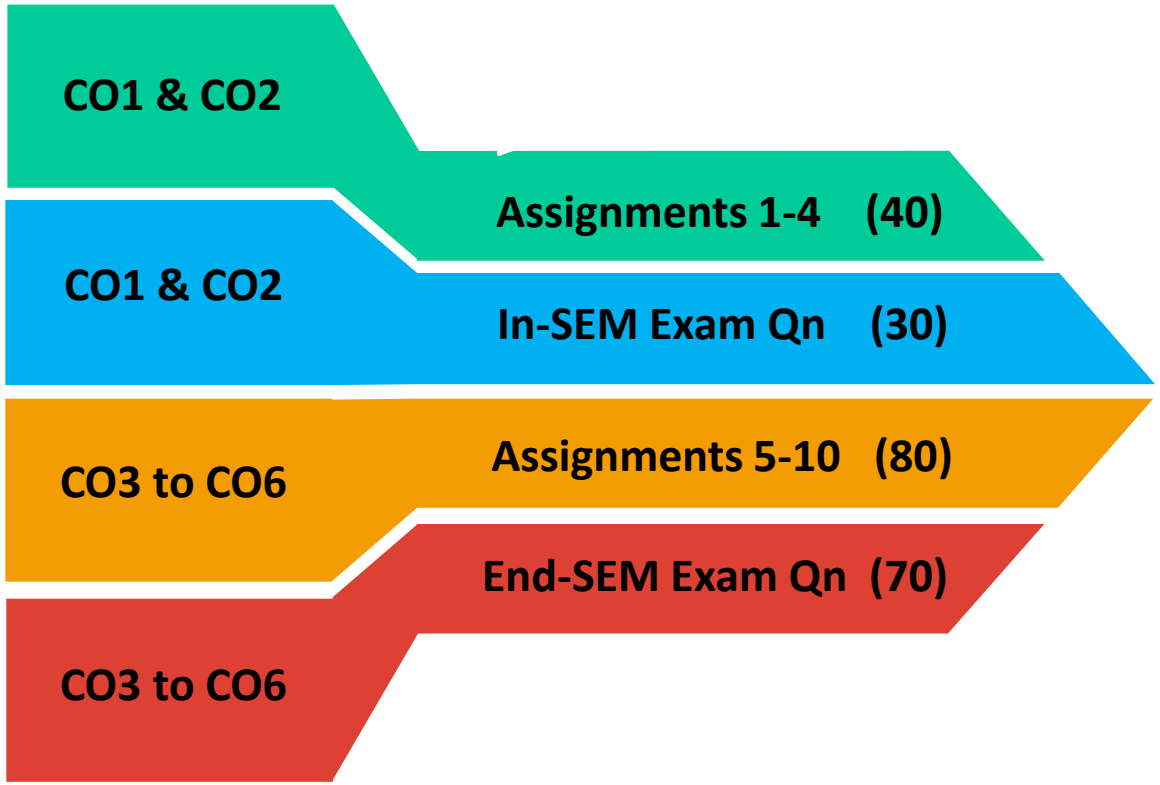
FE	SE	TE	BE	
2019-20	2020-21	2021-22	2022-23	Batch B1
2020-21	2021-22	2022-23	2023-24	Batch B2


Thank You!

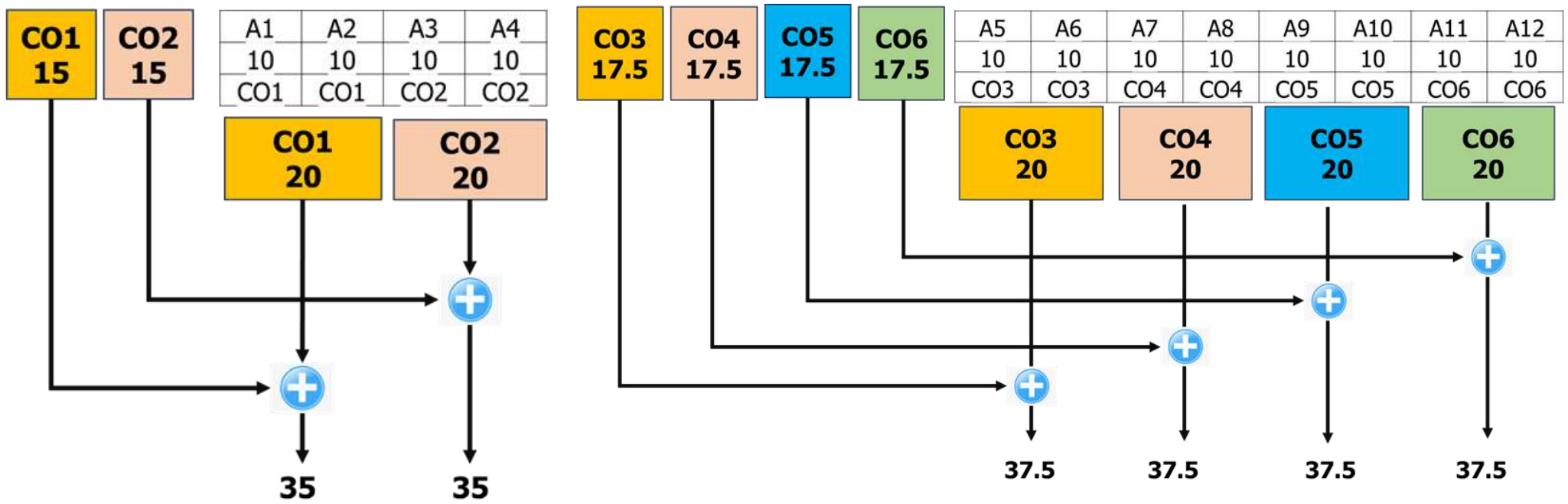

Direct Assessment (80 %)
Indirect Assessment (20 %)
Continuous Assessment
University Examination
Theory Course
LAB Course
Internship Project
In-SEM Theory
End-SEM Theory
End-SEM PAR
Course Exit Survey
Tools Tests, Assign./ Tutorials
Tools Perform, Viva Voca & Records
Tools Reviews, Demo
Evaluation of COs based on Performance in University Examination
Evaluation of COs based on Performance in Continuous Assessment
Calculation of overall CO Attainment
No
Attained
Yes
Take Appropriate Measures Content Delivery & Assessment Method
Increase the Level of CO Attainment
Discussion in DAB, AMC, IQAC, HoD Meetings



CO1					CO2				
Roll	A1	A2	In-Sem	TOT	Roll	A3	A4	In-Sem	TOT
	(10)	(10)	(15)	(35)		(10)	(10)	(15)	(35)
1	5	4	12	21	1	5	4	12	21
2	7	5	10	22	2	7	5	10	22
3	8	2	9	19	3	8	2	9	19
4	9	3	8	20	4	9	3	8	20
5	2	4	10	16	5	2	4	10	16
6	3	8	11	22	6	3	8	11	22
.	4	9	11	24	.	4	9	11	24
.	.	9	8	17	.	.	9	8	17
.	.		.	.	.	.		.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	..	.	.	.	.	..	.	.	.
100	8	7	13	28	100	8	7	13	28



CO1					CO2				
Roll	A1	A2	In-Sem	TOT	Roll	A3	A4	In-Sem	TOT
	(10)	(10)	(15)	(35)		(10)	(10)	(15)	(35)
1	5	4	12	21	1	5	4	12	21
2	7	5	10	22	2	7	5	10	22
3	8	2	9	19	3	8	2	9	19
4	9	3	8	20	4	9	3	8	20
5	2	4	10	16	5	2	4	10	16
6	3	8	11	22	6	3	8	11	22
.	4	9	11	24	.	4	9	11	24
.	.	9	8	17	.	.	9	8	17
.	.		.	.	.	.		.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	..	.	.	.	.	..	.	.	.
100	8	7	13	28	100	8	7	13	28


CO1
15
CO2
15
A1 A2 A3 A4
10 10 10 10
CO1 CO1 CO2 CO2
CO1
20
CO2
20
35
35
CO3
17.5
CO4
17.5
CO5
17.5
CO6
17.5
A5 A6 A7 A8 A9 A10 A11 A12
10 10 10 10 10 10 10 10
CO3 CO3 CO4 CO4 CO5 CO5 CO6 CO6
CO3
20
CO4
20
CO5
20
CO6
20
37.5
37.5
37.5
37.5