



**D Y PATIL**  
COLLEGE *of*  
**ENGINEERING & TECHNOLOGY**  
KASABA BAWADA

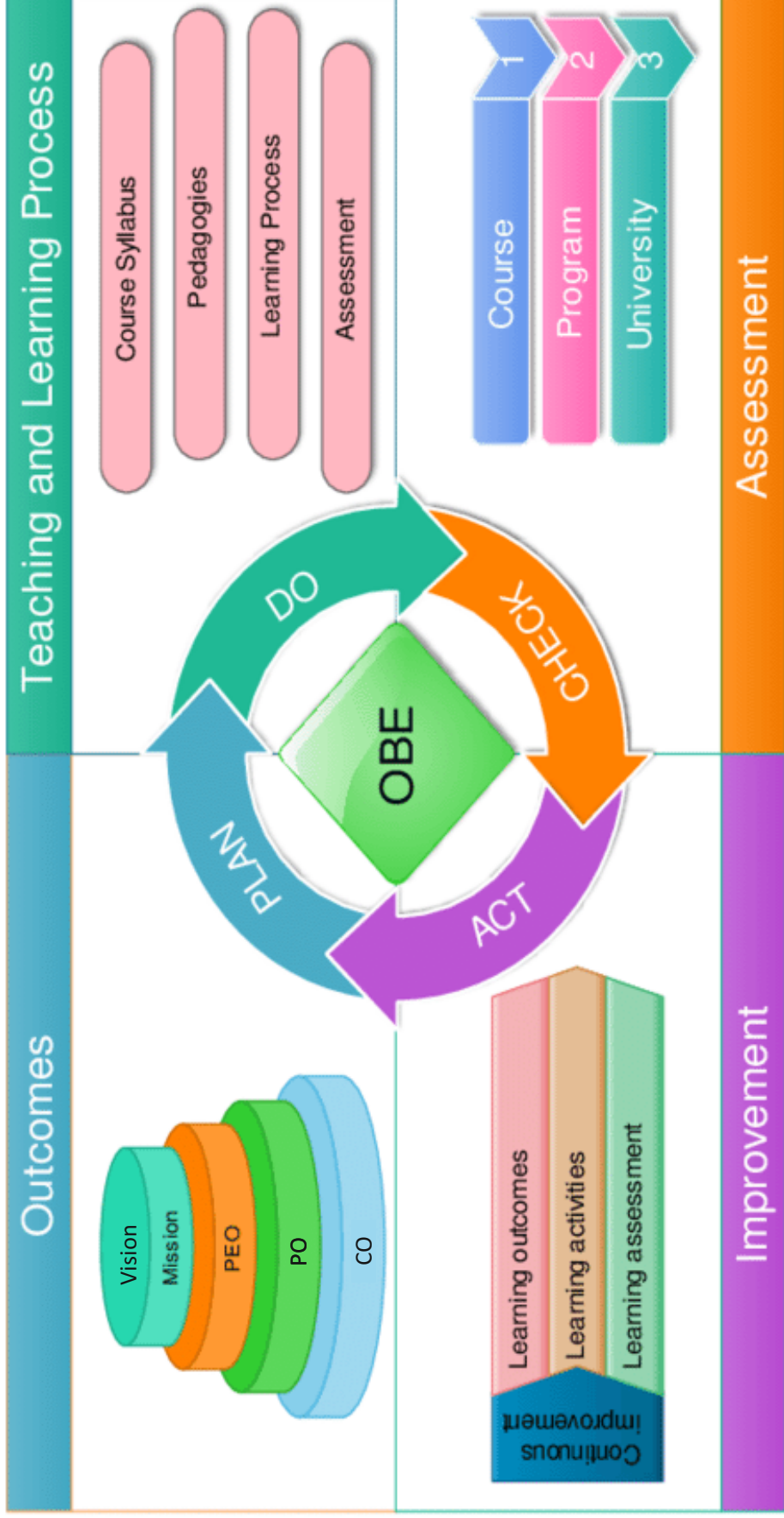
# **Outcome Based Education (OBE) Manual**

**Draft 1**

**Academic Year 2020-21**



**Team OBE**  
**DYPCET, Kolhapur**



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### Abbreviations:

<b>OBE</b>	Outcome Based Education	<b>BTL</b>	Bloom's Taxonomy Level
<b>LOT</b>	Lower Order of Thinking	<b>HOT</b>	Higher Order of Thinking
<b>PEO</b>	Program Educational Objectives	<b>PO</b>	Program Outcome
<b>CO</b>	Course Outcome	<b>PSO</b>	Program Specific Outcome
<b>UE</b>	University Theory Exam	<b>POE</b>	Practical Oral Exam
<b>CE</b>	Course Exit Survey	<b>HoD</b>	Head of Department
<b>PC</b>	Program Coordinator	<b>DAB</b>	Department Advisory Board
<b>PAC</b>	Program Assessment Committee	<b>AY</b>	Academic Year

## Preamble

**Outcome Based Education (OBE)** is an educational model that forms the base of a quality education system. There is no single specified style of teaching or assessment in OBE. All educational activities carried out in OBE should help the students to achieve the set goals. The faculty may adapt the role of instructor, trainer, facilitator, and/or mentor, based on the outcomes targeted.

OBE enhances the traditional methods and focuses on what the Institute provides to students. It shows the success by making or demonstrating outcomes using statements "able to do" in favor of students. OBE provides clear standards for observable and measurable outcomes.

### Benefits of OBE

- **Clarity:** The focus on outcome creates a clear expectation of what needs to be accomplished by the end of the course.
- **Flexibility:** With a clear sense of what needs to be accomplished, instructors will be able to structure their lessons around the students' needs.
- **Comparison:** OBE can be compared across the individual, class, batch, program and institute levels.
- **Involvement:** Students are expected to do their own learning. Increased student involvement allows them to feel responsible for their own learning, and they should learn more through this individual learning.

### India, OBE and Accreditation

From 13<sup>th</sup> June 2014, India has become the permanent signatory member of the Washington Accord. Implementation of OBE in higher technical education also started in India. The National Assessment and Accreditation Council (NAAC) and National Board of Accreditation (NBA) are the autonomous bodies for promoting global quality standards for technical education in India. NBA has started accrediting only the programs running with OBE from 2013.

The National Board of Accreditation mandates establishing a culture of outcome based education in institutions that offer Engineering, Pharmacy, Management program. Reports of outcome analysis help to find gaps and carryout continuous improvements in the education system of an Institute, which is very essential.

## Vision, Mission and Quality Policy of Institute

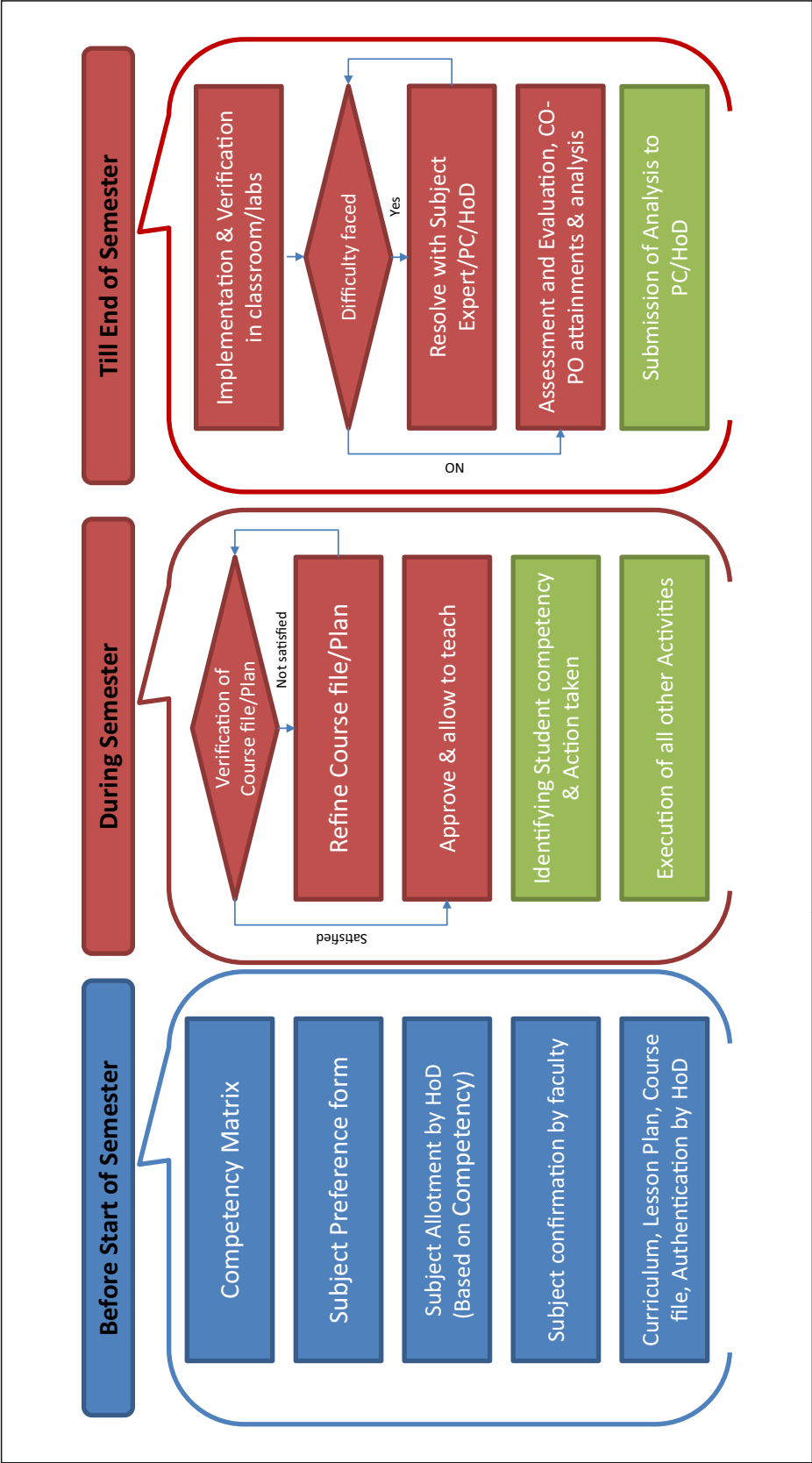
**Vision of Institute:** To become a leading Institute in producing high quality technical professionals for nation building.

<p><b>Mission of Institute:</b></p> <ul style="list-style-type: none"> <li>To nurture the students with high quality education.</li> <li>To promote creativity, excellence and discipline.</li> <li>To explore career opportunities for the students.</li> <li>To enhance industry-institute interaction and research activities.</li> <li>To create social and environmental awareness.</li> </ul>	<p><b>Quality Policy of Institute:</b></p> <p>We are committed to create quality professionals to meet the emerging industrial and social needs through :</p> <ul style="list-style-type: none"> <li>Innovative quality education.</li> <li>Technology oriented system administration.</li> <li>State of art infrastructure.</li> <li>Congenial &amp; disciplined learning environment.</li> <li>Inculcating moral &amp; ethical values among faculty and students.</li> <li>Aiming at continual improvement in all activities.</li> </ul>
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### Program Outcomes (POs)

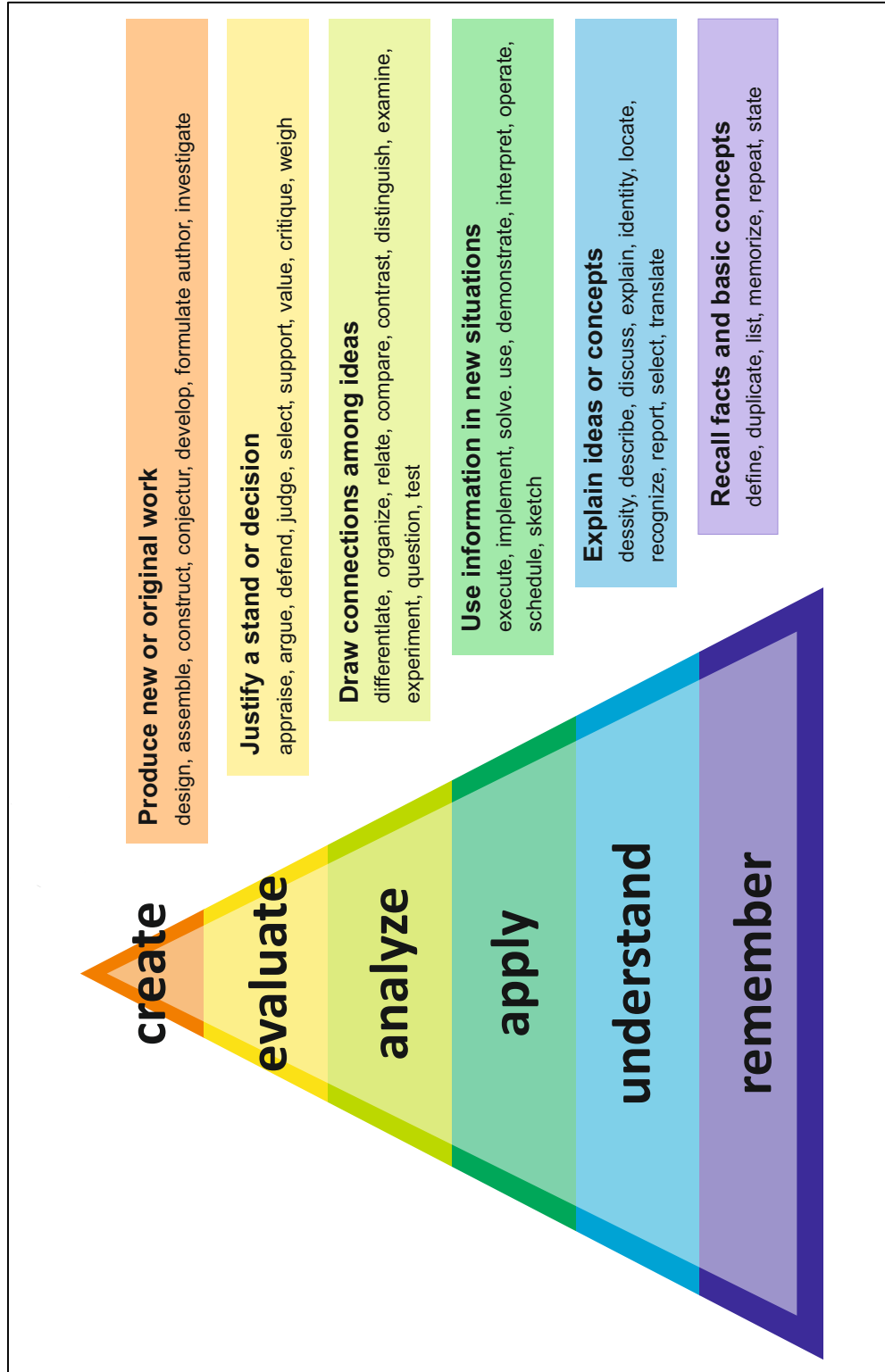
- PO 1 : Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO 2 : Problem Analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO 3 : Design/Development of Solutions :** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO 4 : Conduct Investigations of Complex Problems :** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO 5 : Modern Tool Usage :** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- PO 6 : The Engineer and Society :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO 7 : Environment and Sustainability :** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO 8 : Ethics :** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO 9 : Individual and Team Work :** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO 10 : Communication :** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO 11 : Project Management and Finance :** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO 12 : Life-Long Learning :** 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.

## OBE Framework of the Institute

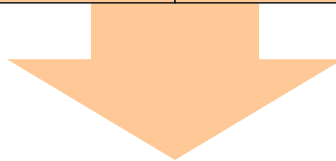




## Revised Bloom's Taxonomy (BT)



The cognitive process dimensions- categories					
Lower Order of Thinking (LOT)			Higher Order of Thinking (HOT)		
Remember	Understand	Apply	Analyse	Evaluate	Create
Recognizing (identifying)  Recalling (retrieving)	Interpreting  Illustrating  Classifying  Summarizing  Inferring (concluding)  Comparing  Explaining	Executing  Implementing	Differentiating  Organizing  Attributing	Checking (coordinating, detecting, testing, monitoring)  Critiquing (judging)	Planning  Generating  Producing (constructing)



The Knowledge Dimension			
Concrete Knowledge		→	Abstract knowledge
Factual	Conceptual	Procedural	Metacognitive
<ul style="list-style-type: none"> <li>• Knowledge of terminologies</li> <li>• Knowledge of specific details &amp; elements</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge of classifications and categories</li> <li>• Knowledge of principles &amp; generalizations</li> <li>• Knowledge of theories, models &amp; structures</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge of subject specific skills and algorithms</li> <li>• Knowledge of subject specific techniques and methods</li> <li>• Knowledge of criteria for determining when to use appropriate procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Strategic Knowledge</li> <li>• Knowledge about cognitive task, including appropriate contextual and conditional Knowledge</li> <li>• Self- Knowledge</li> </ul>



## Action Verbs for Course Outcomes

Sample Action verbs:

Lower Order of Thinking (LOT)			Higher Order of Thinking (HOT)		
Remember	Understand	Apply	Analyse	Evaluate	Create
Define	Explain	Solve	Analyse	Reframe	Design
Describe	Describe	Apply	Compare	Criticize	Create
List	Interpret	Illustrate	Classify	Judge	Plan
State	Summarise	Calculate	Distinguish	Recommend	Formulate
Match	Compare	Sketch	Explain	Grade	Invent
Tabulate	Discuss	Prepare	Differentiate	Measure	Develop
Record	Estimate	Chart	Appraise	Test	Organize
Label	Express	Choose	Conclude	Evaluate	Produce

Illustration (use of action verb w.r.t knowledge dimension and order of thinking):

Use of action verbs	Factual	Conceptual	Procedural	Metacognitive
<b>Remember</b>	<b>List</b> properties of soil	<b>Recognize</b> characteristic of material	<b>Explain</b> working of pump	<b>Identify</b> strategies for report writing
<b>Understand</b>	<b>Summarize</b> features of a new product.	<b>Classify</b> adhesives by toxicity.	<b>Explain</b> assembly instructions.	<b>Predict</b> the behavior of member
<b>Apply</b>	<b>Respond</b> to frequently asked questions.	<b>Provide</b> advice to team members	<b>Carry out</b> pH tests of water samples.	<b>Use</b> modern techniques to get solution
<b>Analyse</b>	<b>Explain</b> the selection of tool/ activity.	<b>Differentiate</b> LOT and HOT	<b>Integrate</b> compliance with regulations.	<b>Assess</b> the project work
<b>Evaluate</b>	<b>Select</b> the appropriate tool	<b>Determine</b> relevance of results.	<b>Judge</b> efficiency of sampling techniques.	<b>Reflect</b> on one's progress.
<b>Create</b>	<b>Generate</b> a log of daily activities.	<b>Assemble</b> a team of experts.	<b>Design</b> efficient project workflow.	<b>Create</b> a learning portfolio.

## Guidelines for writing Course Outcome Statements

**Well-written course outcomes involve the following parts:**

1. Action verb
2. Subject content
3. Level of achievement as per BTL
4. Modes of performing task (if applicable)

**Illustration:**

Students are able to

- 1) Design column splices and bases. → Action verb (underlined)
- 2) Determine the losses in a flow system. → Subject content
- 3) Use structural analysis software to a competent Level. → level of achievement
- 4) Present seminar on real life problems. → Modes of performing task with action verb (underlined)

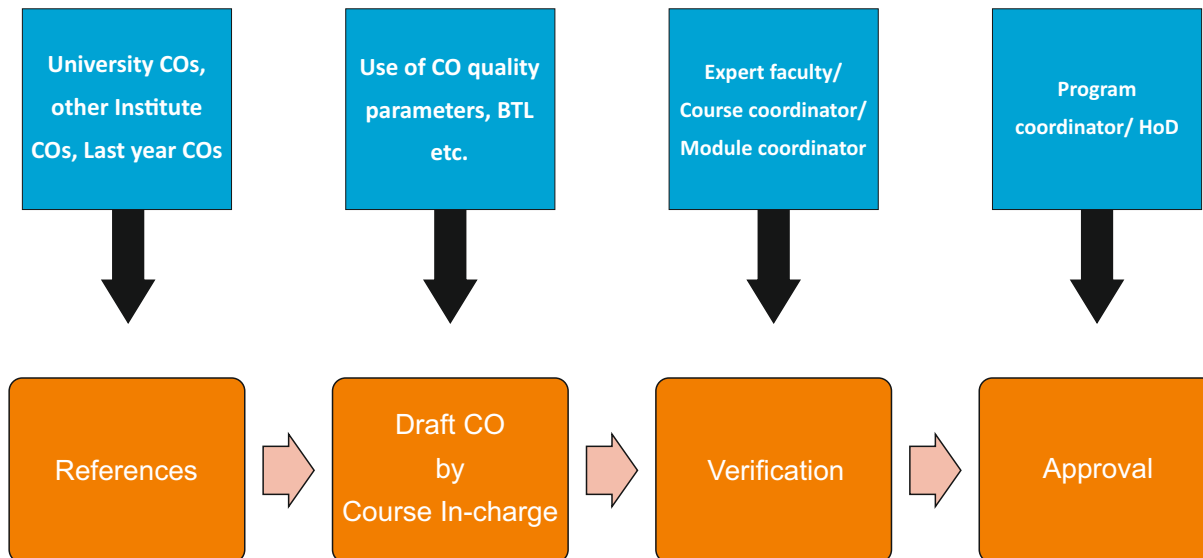
**While writing COs the following questions/points must be addressed properly.**

<b>Specific</b>	Is there a description of precise behavior and the situation it will be performed in ? Is it concrete, detailed, focused and defined ?
<b>Measurable</b>	Can the performance of the outcome be observed and measured ?
<b>Achievable</b>	With a reasonable amount of efforts and application can the outcome be achieved ? Are you attempting too much ?
<b>Relevant</b>	Is the outcome important or worthwhile to the learner or stakeholder ? Is it possible to achieve this outcome ?
<b>Time-Bound</b>	Is there a time limit, rate, number, percentage or frequency clearly stated ? When will this outcome be accomplished ?

**Note:** If Laboratory is given as separate course (with course code) then there should be separate course outcomes for Laboratory.

## Quality of Course Outcome

Process at department level to maintain quality of CO



**Guidelines/Checklist for COs:**

<b>Number of COs</b>	2 to 4
<b>CO essentials</b>	Action Verb, Subject Content, Level of Achievement, Modes of Performing task (If Applicable)
<b>Based on BTL</b>	Understand, Remember, Apply, Analyse, Evaluate, Create
<b>Number of BTL Considered in one course</b>	Minimum 3
<b>Technical Content/ point of curriculum</b>	All curriculum contents are covered
<b>Curriculum gap</b>	Additional CO for gap identified/filling. Adds more weightage

## CO-PO Mapping Guidelines

### CONSIDER ANY TWO MINIMUM CRITERIA FOR CO-PO MAPPING JUSTIFICATION

#### **A) Contact Hours: Lecture, Tutorial and Practical**

Level	Contact Hours in Percentage (including Lecture, Tutorial & Practical)
No mapping (-)	< 5%
Low (1)	5- 15%
Medium (2)	15- 25%
High (3)	>25%

#### **Description**

Number of Lectures = 3per week x 12 weeks = 36 Hours

Tutorial = 1Hr x 12 Weeks = 12 Hours

Practical = 2Hr x 12 Week = 24 Hours

Total Hrs = 36+12+24 = 72 Hrs

Example: Let, CO1 related points are engaged in 10 lectures + 1 Tutorial and 2 practical Hours

Then contact hours = 10+1+2x2 = 15 hours

Therefore, contact hours in percentage =  $(15/72) \times 100 = 20.8\%$ . Medium mapping (2)

#### **B) Number of Assessment Tools used**

Level	Assessment tools used to assess the CO
No mapping (-)	0
Low (1)	1 or 2
Medium (2)	3
High (3)	4 or more

#### **Description**

CO assessment tools: Mid-term test, end term test, class test, surprise test, oral, continuous internal assessment (Assignment, Lab practical assessment), course exit survey, University theory exam, oral exam/ practical oral exam, external feedback, Activities (Survey, guest lecture, workshop, seminar, case studies, mini/minor projects etc.)

Every CO must be correlated with each PO and appropriate mapping may be selected.

#### **C) Key words**

Most of the times, appropriate keyword is sufficient for mapping.

Level	Keywords Used in writing COs
No mapping (-)	Key words related with LOT and not related with course or any outcomes
Low (1)	Part of PO is reflected through keywords/action verbs
Medium (2)	Major part of PO is reflected through keywords/action verbs. + moderate level performance is expected from student to achieve PO
High (3)	Exact action verb of PO + critical performance expected from student to achieve PO

### D] Critical Assessment Record for PO5 to PO12

Level	Assessment Depth
No mapping (-)	No rubric used for assessment
Low (1)	Single rubric category used for assessment
Medium (2)	Two rubric category used for assessment
High (3)	Three or more rubric category used for assessment

### Illustration

Category No.	Rubric Category	Level of Performance			
		4	3	2	1
1	Group Leader	Seeks opportunities to lead; while leading is attentive to each member	Will take lead if group insists; not good at being attentive to each member	Resists taking on leadership role; while leading allows uneven contributions	Never shows up
2	Contribution	Always contributes; quality of contributions is exceptional	Sometimes contributes; quality of contributions is fair	Rarely contributes; contributions are often peripheral or irrelevant; frequently misses team sessions	Never shows up and never contributes.
3	Cooperation	Always cooperative with all members, support good initiatives	cooperative with members, but sometimes argue	cooperative with few members, and argue most of time	Non-cooperative

### E] Assessment Type

Level	Assessment Depth
No mapping (-)	Test items (1) <b>OR</b> Nil
Low (1)	Test items (2) <b>OR</b> Assessment item (1)
Medium (2)	Test items (2) + Assessment item (1) <b>OR</b> Assessment item (2)
High (3)	Test items (2) + Assessment item (2) and More

#### Test Item:

Mid-term, End term, class test, surprise test, University theory exam (Questions + additional information)

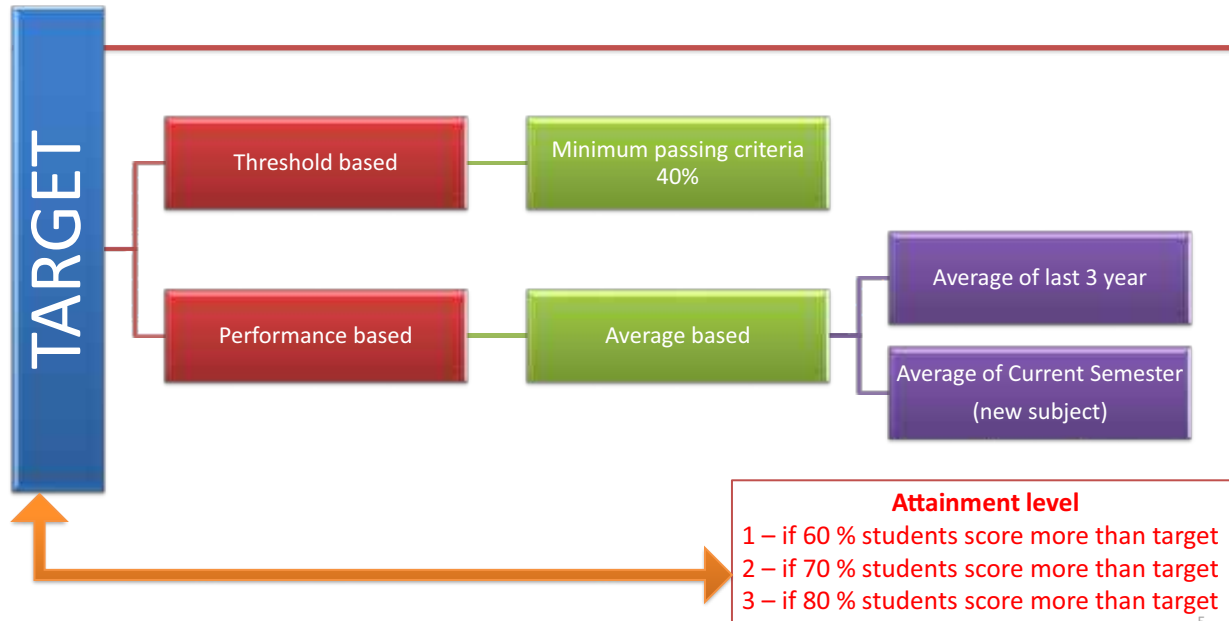
#### Assessment items:

Quizzes, Assignment problems, simulation, laboratory experiments, project, field work, report presentation, tutorials, activities, etc.

**F] Any other criteria with proper justifiable document is acceptable.**

**Targets/ Attainment Levels**

**SETTING TARGETS FOR ATTAINMENT**

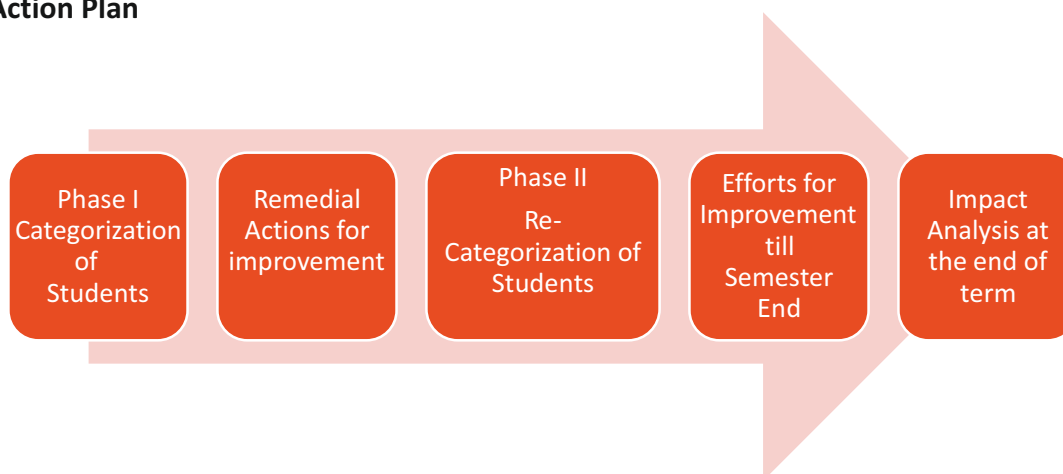


**Illustration**

Case of Course	Avg % result in last year/ 3 years	Clue for keeping target	Attainment 1 if	Attainment 2 if	Attainment 3 if
Course 1	<40 %	Threshold	40 % cross target	50% cross target	60% cross target
Course 2	Above 40% but less than 50%	Threshold with high attainment level	60 % cross target	70% cross target	80% cross target
Course 3	Above 50 %	Average based	40 % cross target	50% cross target	60% cross target
Course 4	Above 80 %	Average based with high attainment level	60 % cross target	70% cross target	80% cross target

## Student Competency

### Chart of Action Plan



### Guidelines for First Year

Phase I- Categorization (After 15 Days of start of semester)	Phase II- Re-categorization (After Mid Term Result)
12 <sup>th</sup> Marks	Mid Term Result
Prerequisite Test	Timely Completion of work
Surprise Test after 15 days	Lab Performance
Attendance & Behaviour	Attendance & Behaviour
	Previous Semester University Result (Applicable for Sem-II)

### Guidelines for Higher Classes [SY, TY & BE]

Phase I- Categorization (After 15 Days of start of semester)	Phase II- Re-categorization (After Mid Term Result)
Previous semester University Result whichever is available	Mid Term Result
Prerequisite Test	Timely Completion of work
Surprise Test after 15 days	Lab Performance
Attendance & Behaviour	Attendance & Behaviour
	Previous semester University Result

### Base Score for student category

<50% -Slow Learner

50% to 65% - Average Learner

>65%-Advanced Learner

## Strategies for Slow, Average and Advanced Learners

### For Slow learners

- Document/record of remedial classes with timetable & attendance
- Specially designed assignment/ task
- Student study group for peer to peer learning
- Individual Counseling
- Student help desk

**Note: Remedial sessions should be conducted once every week.**

### For Average Learners

- Additional assignment/ task
- Encouraging for timely and effective completion of work
- Conduction of quiz, orals etc.
- Solving previous year University question papers and test papers
- Presentation on technical topics/ case studies/mini projects

**Note: Activities should be on continuous basis.**

### For Advanced Learners

- Encouraging to present & publish papers in journals/conferences/competitions
- Guidance for GATE/ competitive Examination
- Encouraging to participate in professional activities.
- Specially designed activities to improve the portfolio of students.
- Individual guidance for career building

**Note: Activities should be on continuous basis.**



## Rubrics for Assessment

### What is Rubric?

- A scoring guide with criteria for evaluating students' work in direct relation to one or more of the PO's and a rating scale indicating differing levels of performance.

### Rubrics are:

- Used to examine how well students have met CO or PO rather than how well they perform compared to their peers.
- Typically include measurable descriptors that define expectations at each level of performance for each criterion.

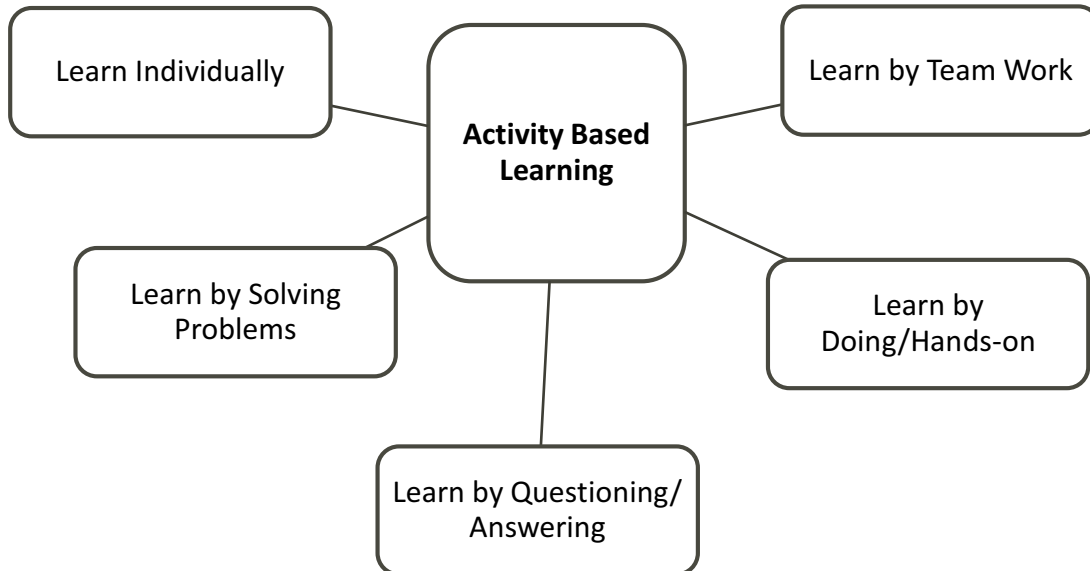
### Sample Rubrics for CO assessment in Laboratory: (10 Marks)

Category	Level of Performance		
	3 marks	2 marks	1 marks
<b>Performance in Lab (3)</b>	<ul style="list-style-type: none"> <li>• Able to perform experiment independently within prescribed time</li> <li>• The result is close or to standard value.</li> </ul>	<ul style="list-style-type: none"> <li>• Able to perform experiment within prescribed time</li> <li>• Large deviation of result from standard value</li> </ul>	<ul style="list-style-type: none"> <li>• Able to perform the experiment partially with no results.</li> </ul>
<b>Level of Understanding / Q&amp;A (3)</b>	<ul style="list-style-type: none"> <li>• Able to show strong theoretical background of experiment</li> <li>• Able to interpret proper data to reach conclusion</li> </ul>	<ul style="list-style-type: none"> <li>• Partially show strong theoretical background of experiment</li> <li>• Partially able to interpret data to reach conclusion.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of theoretical background of experiment or lack of interpretation of data</li> </ul>
	Documentation Level		
	4 marks	3 marks	2 marks
<b>Quality of Submission (4)</b>	<ul style="list-style-type: none"> <li>• Graphs, table, contents are well constructed.</li> <li>• All-important calculations and result have been clearly made.</li> <li>• Conclusions/ observations/ comments done clearly</li> </ul>	<ul style="list-style-type: none"> <li>• Shortfalls found in any of the contents of the report viz. graphs, tables, calculations, results, conclusions/ Comments, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Report submitted but not written properly.</li> </ul>

Rubric maximum score = 4+3+3 (high marks) = 10 (100%)

Rubric minimum score = 1+1+2 (low marks) = 4 (40%)

## Activity Based Learning



### Examples:

MOOC, Flipped Classroom, Think Pair Share, Think Pair Solo, Four Corners, Round Robin, Collaborative Learning, Jig-Saw Puzzle, Matrix Method, Peer Learning, Work-Based Learning, Problem-Based Learning, Personalized Learning, Group Discussion, Debate, Case Studies, Fish Bowl, Reciprocal Teaching, etc.

## List of Assessment Tools

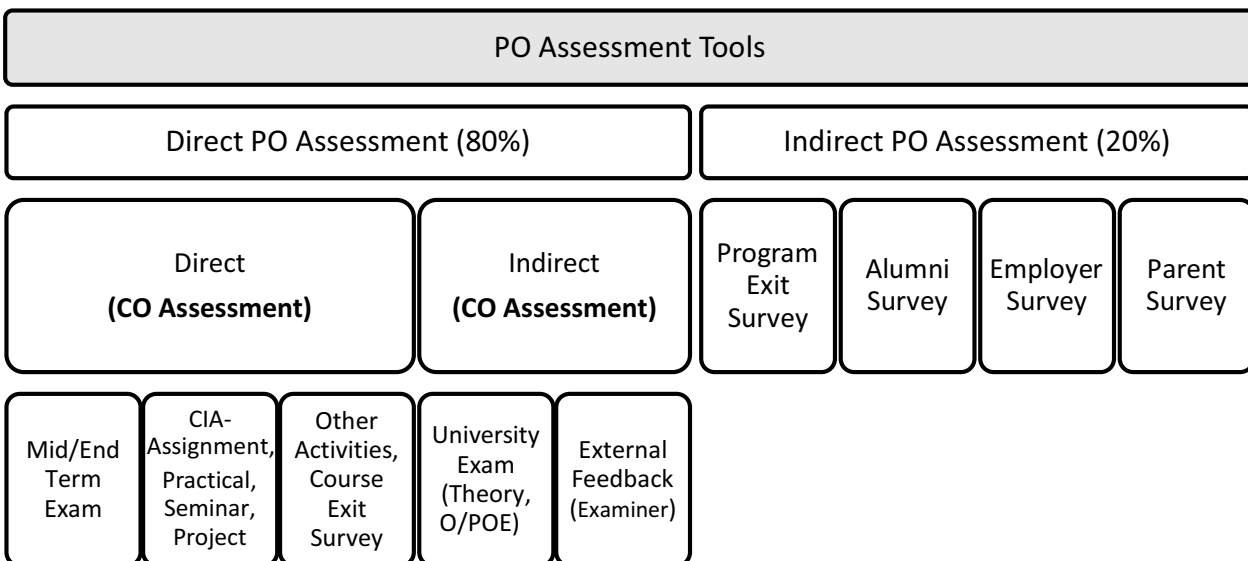
All (Direct + Indirect) CO Assessment Tools = PO Direct Assessment Tools

### Sample CO Assessment Tools

- Mid Term Test
- End Term Test
- Quiz
- Assignment
- Practical/ Lab work
- Industrial Visit, Workshop
- Other Task/Activity
- University Exam
- Oral/POE
- Course Exit Survey
- External Feedback (External Examiner/Trainer, Campus Placement Technical Expert)

**Direct Tools:** (Measurable in terms of marks and w.r.t. CO) Assessment done by faculty at Institute level

**Indirect Tools:** (Non measurable in terms of marks and w.r.t. CO) Assessment done at University Level



### Sample Indirect PO assessment Tools

- Program Exit Survey
- Alumni Survey
- Employer Survey of Alumni
- Parent Feedback

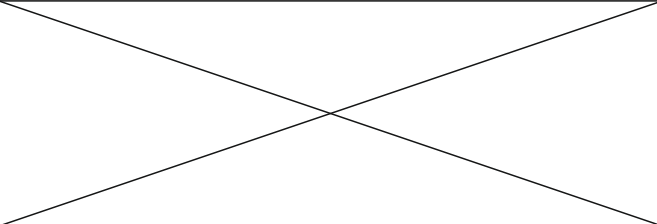
## CO Attainment Calculations

### Attainment Weightage:

Consider following weightage for PO Assessment Tools

PO Assessment Tools	
Direct PO Assessment (80%)	Indirect PO Assessment (20%)

Consider following weightage for CO Assessment Tools

PO Direct Assessment Tools = CO Assessment Tools		
Direct CO Assessment	Indirect CO Assessment	
20	80	University BE Curriculum
60	40	University CBCS (from 2018 FY batch)

### Illustration of Internal Test Examination Attainment:

Course	Engg. Mathematics
Maximum Marks	30
Number of Students Appeared	60
Passing Level (Threshold Based Target)	12 (40% here)

Now, we need target (mentioned above in table) and marks of all students to calculate attainment. The table below shows marks of all students

5	23	5	11	21	0
0	12	5	2	7	4
0	22	3	3	10	7
5	18	9	20	17	24
23	8	25	16	9	10
12	2	8	11	22	4
26	13	2	1	30	19
24	22	16	10	1	2
12	21	8	25	11	4
24	9	22	20	20	17

Now

Number of student achieving 12 or more marks	28
% of students achieving 12 or more marks	$(28/60) * 100 = 46.6\%$

- 1 – if 40 % students score more than target
- 2 – if 50 % students score more than target
- 3 – if 60 % students score more than target

**Then Attainment is = 1 (from 46.6%)**

### Illustration of Feedback/Rubric Based Assessment & Attainment

Course	SOM
Maximum Marks	5
Number of Students Appeared	60
Passing Level (Threshold Based Target)	3 (>50% here)

Now, we need target (mentioned above in table) and response/feedback of all students to calculate attainment. The table below shows score/response of all students

4	3	3	1	2	5
3	3	2	1	2	4
4	2	5	5	1	5
1	1	5	2	2	4
2	2	5	3	5	1
2	4	2	5	2	1
3	4	4	2	4	3
5	2	4	3	2	5
5	5	4	4	4	2
5	4	4	2	3	5

Now

Number of student giving 3 or more score	37
% of students with 3 or more marks	$(37/60)*100 = 61.7\%$

- 1 – if 40 % students score more than target
- 2 – if 50 % students score more than target
- 3 – if 60 % students score more than target

**Then attainment is = 3 (from 61.7%)**

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#### Overall Attainment of CO

Let's assume CO1 is assessed using any 2 direct + 2 Indirect CO assessment tools, then

**A. Overall CO Attainment = (Weightage x Direct CO attainment) + (Weightage x Indirect CO attainment)**

**For University regular BE Curriculum and**

B. Overall CO Attainment = (20 % x Direct CO attainment) + (80% x Indirect CO attainment)

**For University CBCS Pattern,**

C. Overall CO Attainment = (60 % x Direct CO attainment) + (40% x Indirect CO attainment) for Autonomous Pattern

**# Note: Appropriate % weightage distribution may be considered for any number of direct/indirect assessment tools with proper justification at department/faculty level.**

### Illustration

Course CO	PO												PSO			BTL
	1	2	3	4	5	6	8	9	10	11	12	1	2	3		
<b>C202.1</b>	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Remember
<b>C202.2</b>	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	Understand
<b>C202.3</b>	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	Apply
<b>C202.4</b>	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	Apply
<b>C202.5</b>	-	-	3	-	2	-	-	-	-	-	2	-	-	-	-	Analyse
<b>C202.6</b>	-	-	-	-	3	2	-	-	-	-	-	3	-	-	-	Analyse

So we finalize this assessment tools and then weightages

CO1 to CO4: Midterm & or end term + Continuous assessment (Assignment) + UE (PO1, 2)

CO5: Mid & or End term + Assignments + **Activity (rubric for PO5, 12)** + UE (PO3)

CO6: Mid & or End term + Assignments + **Activity (rubric for PO5, 6)** + UE (PSO1)



<b>Direct Tools (60%) (with justified/appropriate weightage)</b>	<b>Indirect Tool (40%)</b>
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### Sample List of Activities with BTL

Activities	Possible BTL	PO Mapping
Tutorial- Write-ups	Understand, Apply	Any relevant PO from 1 to 4
Practical-Experiments	Understand, Apply, Analyse, Evaluate, Create	Any Relevant PO
Test/Quiz	Understand, Apply, Analyse	Any relevant PO from 1 to 4
Students' Seminar	Understand, Apply, Analyse	Any PO from 1, 2, 8, 10
Case Study	Understand, Apply, Analyse	Any Relevant PO
Presentation/Oral	Understand	
Guest Lecture	Understand	
Visits	Understand	
Survey & Analysis	Apply & Analyse	
Workshop/Hands-on Training	Apply, Analyse, Evaluate	
Task	Evaluate, Create	
Minor Project	Create	

Note: Faculty/ department can conduct other than the mentioned activities with BTL, PO and proper justification.

#### Activity Planning Guidelines (PO5 to PO12)

Sr. No.	Activity	Contact Hours	Minimum Assessment Tool	Mapping Level
<b>1</b>	Seminar Presentation	1 to 6 hrs	Feedback or Quiz or Rubric Based Assessment	<b>1</b>
	Case Study			
	Guest Lecture			
	Visits			
	Survey & Analysis			
<b>2</b>	Visits	7 to 20 Hrs	i) Feedback or Quiz	<b>2</b>
	Survey & Analysis		ii) Rubric Based Assessment for Report, Presentation etc.	
	Workshop / Hands -on Training			
	Task			
<b>3</b>	Workshop/Hands - on Training	More than 20 Hrs	i) Feedback or Quiz	<b>3</b>
	Task		ii) Rubric Based Assessment for each PO	
	Minor Project		iii) Impact analysis	

Note: Department may use other additional criteria and justify the mapping level.

## Contribution of Course Attainment in PO Attainment

### Illustration

Let us assume CO-PO mapping of a course

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	2	1	-	-	-	-	-	-	-	-	-	3	-	-
3	-	3	1	-	-	-	-	-	-	-	-	-	3	-	-
4	-	3	-	2	-	-	-	-	-	-	-	1	3	-	-
<b>Average</b>	3	3	1	2	-	-	-	-	-	-	-	1	3	-	-

Overall Attainment of CO is as below

CO	Direct Tool Attainment (A)	Indirect Tool Attainment (B)	Overall CO Attainment = 0.2x A + 0.8 x B
1	2	3	2.8
2	3	3	3
3	2	3	2.8
4	1	3	2.6

Hence, final contribution of CO attainment in PO attainment can be done using the below formula,  
CO Contribution = Overall CO attainment X ( CO-PO Mapping weightage / 3)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	2.00	1.00	-	-	-	-	-	-	-	-	-	3.00	-	-
3	-	2.80	0.93	-	-	-	-	-	-	-	-	-	2.80	-	-
4	-	2.60	-	1.73	-	-	-	-	-	-	-	0.86	2.60	-	-
<b>Average</b>	2.80	2.50	0.96	1.73	-	-	-	-	-	-	-	0.86	2.80	-	-

### Sample calculations:

CO1- PO1 mapping attainment  $2.8 \times 3/3 = 2.80$  (up to 2 decimal places)

CO2- PO2 mapping attainment  $3 \times 2/3 = 2.00$

CO2- PO3 mapping attainment  $3 \times 1/3 = 1.00$

CO3- PO3 mapping attainment  $2.8 \times 1/3 = 0.93$

CO4- PO12 mapping attainment  $2.6 \times 1/3 = 0.86$



## Continuous Improvement

### A) Contribution of CO in PO attainment and Continuous Improvement (Faculty Level)

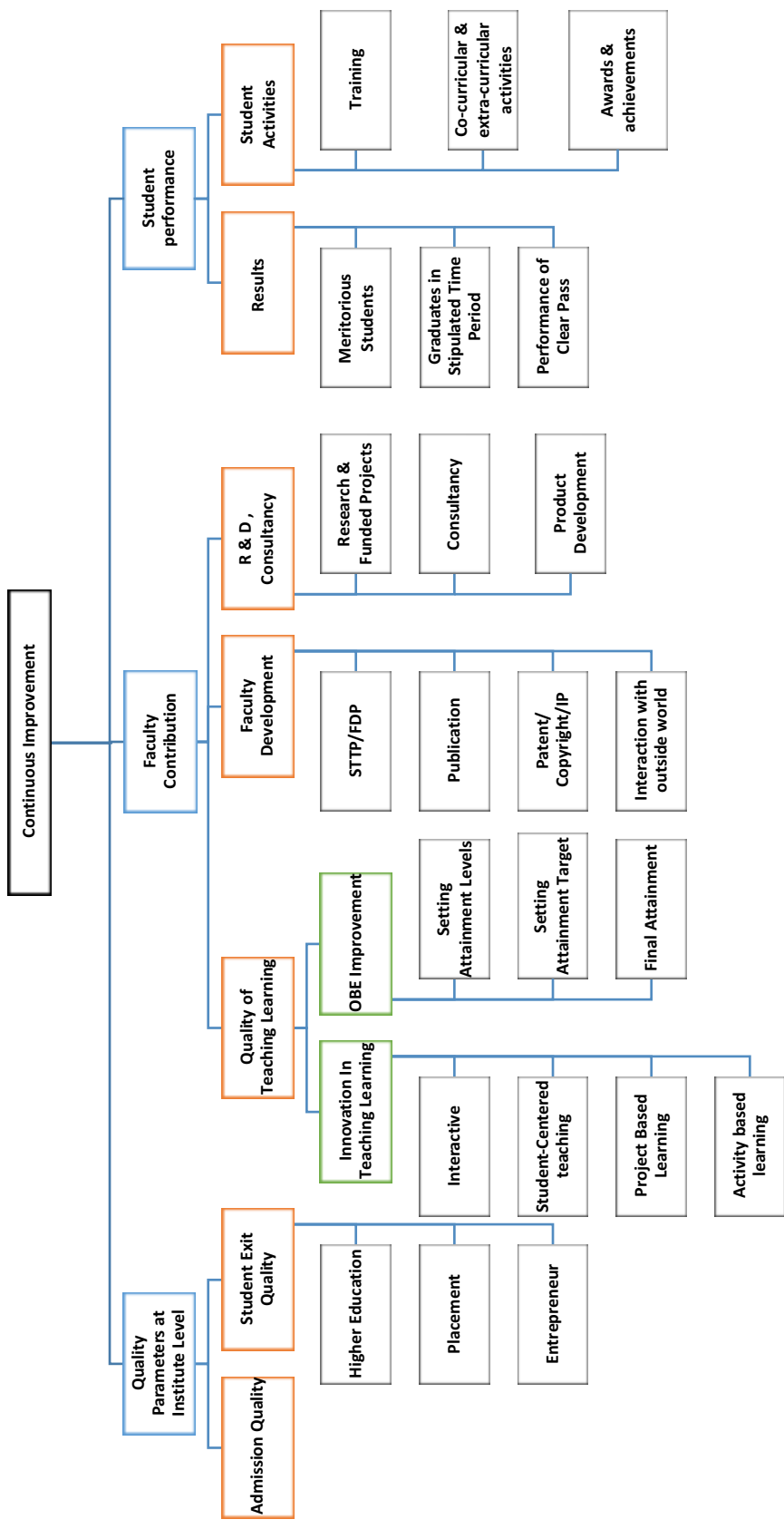
Outcome	Action to be taken by faculty
High attainment of all CO-PO (>2.5 out of 3)	Set new higher targets or attainment levels for next Academic Year (A.Y.).
Moderate attainment of all CO-PO (1.8 to 2.49 out of 3)	Record observations, Continue action plan of last A.Y. with plan for improvements.
Low attainment of all CO-PO (0.9 to 1.79 out of 3)	Record observations, assess the target set, revise/improve action plan of last A.Y. to achieve the attainment with plan for improvements.
CO-PO not attained, poor performance(<0.9 out of 3)	Record observations, Critical assessment of target with Program Assessment Committee (PAC), Revise action plan of last A.Y. at faculty/department level.

### B) PO attainment and Continuous Improvement (PC and HoD Level)

Category	Outcome	Action by PC and HoD
Course related	PO attained highly	Include activities with HOT.
	PO not attained highly	Identify concerned courses, plan for immediate improvements, guide, support and monitor its execution.
Activity related	Activities Conducted	Critical assessment, impact analysis to be done and revise as per the need for improvements.

### List of Documents

Sr.	Title	Details
1	Vision, Mission of Institute	Maintain at Deptt. Level (PC & HoD)
2	Vision, Mission of Program	Maintain at Deptt. Level (PC & HoD)
3	PEO of Program, PEO-PO/PSO Mapping	Maintain at Deptt. Level (PC & HoD)
4	PO and PSO of Program	Maintain at Deptt. Level (PC & HoD)
5	CO + PO/PSO + Mapping	Maintained by every faculty in Course File
6	Revised Bloom's Taxonomy Level and OBE Framework	Print to be maintained in Course File of Faculty & displayed in department all labs
7	Course List with Course Codes	Maintain at Deptt. Level (PC & HoD)
8	List of PO Assessment Tools	Maintain at Deptt. Level (PC & HoD)
9	List of CO Assessment Tools Used	Maintained by every faculty in Course File
10	Program Assessment Committee & DAB	Maintain at Deptt. Level (PC & HoD)
11	Course and Module Coordinators	Maintain at Deptt. Level (PC & HoD)
12	Course Plan	Along with delivery details and assessment tools by Faculty
13	Attainment Levels/ Targets of all courses of your program	Maintained by every faculty in Course File
14	Rubrics	Course wise rubrics to be maintained by every Faculty All activity rubrics to be maintained at deptt. Level (PC & HoD)
15	Record of all Assessment Details	Test Papers, Model Answers, Sample Answer Papers, Results, Sample Journals of students, Lab Manuals, Sample Seminar, Project Report & other record concerned with assessment to be maintained by Faculty
16	Slow-Advanced Learners	Identification, Action Taken Record to be maintained by Faculty
17	Course Exit Survey of every course	To be maintained by concerned Faculty
18	Program Exit Survey, Alumni Feedback, Employer Feedback	End of Final Year: Maintain at Deptt. Level (PC & HoD)
19	CO Attainment	At End of Course: Maintained by Faculty and to be submitted to department
20	PO Attainment	At end of A.Y.: (Direct + Indirect) to be maintained by PC & HoD at Deptt. Level
21	Impact Analysis and Continuous Improvement Related Documents	CO level documents to be maintained by concerned faculty. PO level documents to be maintained by PC and HoD.





## Vision

To Become A Leading Institute In Producing High Quality Technical Professionals For Nation Building.

## Mission

1. To nurture the students with high quality education.
2. To promote creativity, excellence and discipline.
3. To explore career opportunities for the students.
4. To enhance industry-institute interaction and research activities.
5. To create social and environmental awareness.

## Quality Policy

We are committed to create quality professionals to meet the emerging industrial and social needs through

1. Innovative quality education.
2. Technology oriented system administration.
3. State of art infrastructure.
4. Congenial & disciplined learning environment.
5. Inculcating moral & ethical values among faculty and students.
6. Aiming at continual improvement in all activities.



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ENGINEERING & TECHNOLOGY  
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