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Y. B. PATIL POLYTECHNIC

AKURDI, PUNE 44

Outcome Based Education (OBE) Manual

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INDEX

Abbreviations:

OBE Outcome Based Education
LOT Lower Order of Thinking
PEO Program Educational Objectives
CO Course Outcome
CT Class test
DAB Department Advisory Board
IQAC Internal Quality Assessment Committee
BTL Bloom's Taxonomy Level
HOT Higher Order of Thinking
PO Program Outcome
PSO Program Specific Outcome
PR/OR Practical Oral Exam

Preamble

Outcome-Based Education (OBE) framework typically sets the stage for the educational philosophy and principles that guide the teaching and learning process. It emphasizes the importance of focusing on clear, measurable outcomes for students, ensuring that education is aligned with the skills, knowledge, and competencies students are expected to acquire by the end of a program or course. There is not any Specified style of teaching or assessment in the OBE. All educational activities carried out in OBE should support the students to achieve the set goals. The faculty can play the role of trainer ,instructor, facilitator, and mentor based on the outcomes targeted.

OBE is student-centered, focusing not just on what the instructor teaches but, more importantly, on what the students can demonstrate they have learned. It is an educational framework that clearly defines the expected outcomes for each course or program, ensuring that these outcomes are measurable, achievable, and aligned with the needs of society, employers, and the students themselves.

Through the systematic planning, assessment, and continual improvement of learning activities, OBE empowers students to take responsibility for their own learning, while also providing educators with the tools to guide and assess student progress. This approach promotes a more personalized and flexible learning experience that supports lifelong learning and prepares graduates for success in an increasingly complex world.

Benefits of OBE

- **Student-Centered Learning:** OBE focuses on what students need to know and be able to do by the end of a course or program. This ensures that learning outcomes are clear, measurable, and achievable, helping both students and instructors understand the expectations.
- **Students Active Learning:** OBE encourages students to take responsibility for their learning. By aligning activities, assessments, and resources with the desired outcomes, students are more likely to engage in the learning process.
- **Real-World Interaction:** Since outcomes are often aligned with industry needs and real-world applications, students see the direct relevance of their studies through industrial training.

Vision Mission and Quality Policy of Institute

Vision of Institute: Transforming teenage power into technically competent and socially responsible human resource.

Mission of Institute:

To direct our service of education to the students ensuring their development by unfolding and activating their unique potential, creative ability and equipping them with technical and generic skills so that they would prove a talent pool to the industry and society at large.

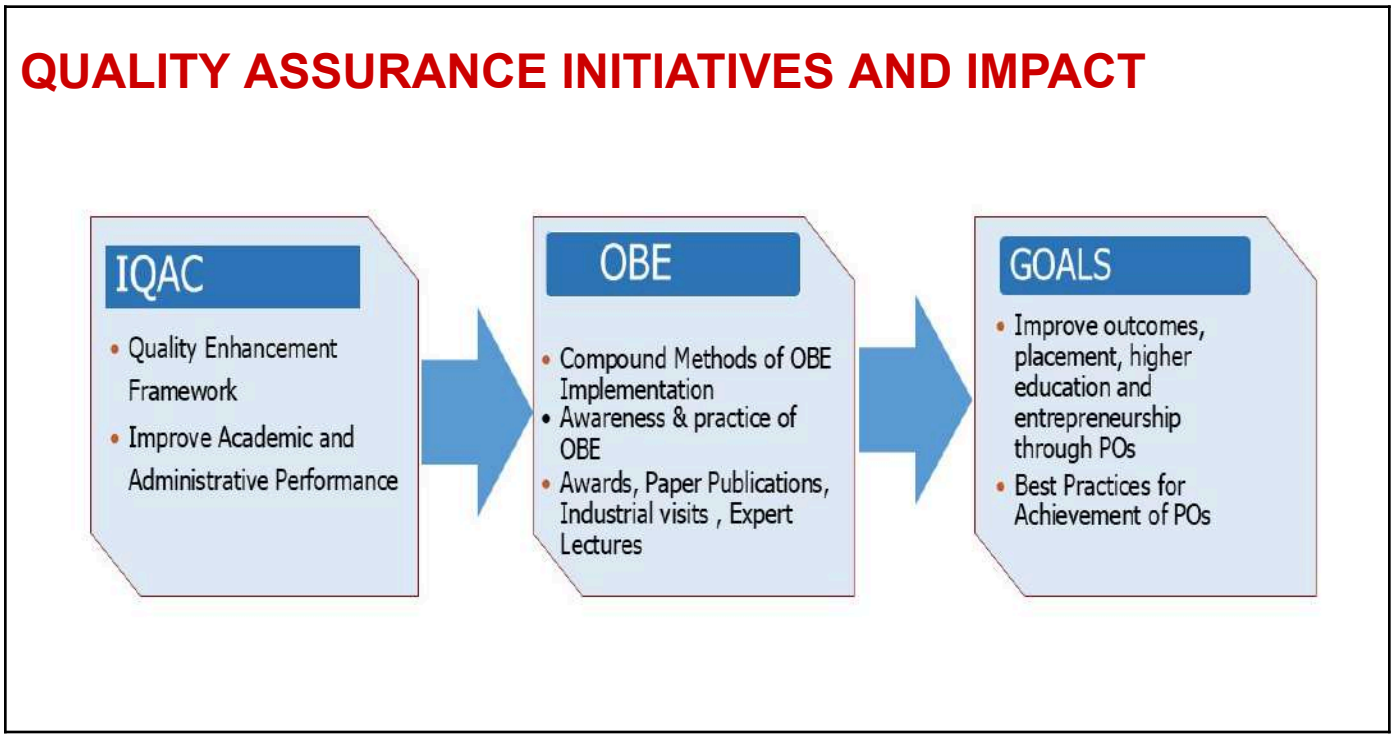
Quality Policy of Institute:

We are pledged to bound to create technically competent and socially responsible human resource professionals through:

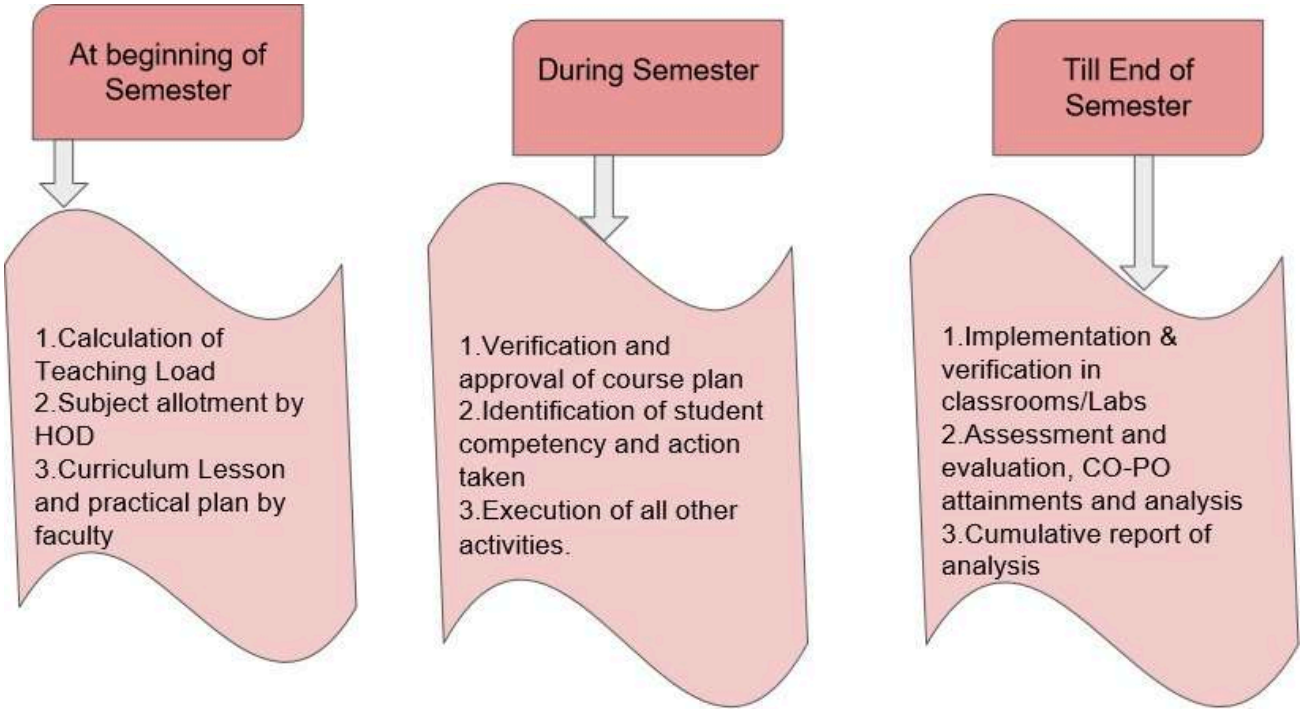
- Academic Excellence..
- Holistic Development.
- Industry collaboration..
- Inculcating Ethical and moral values among faculty & students
- Developing a culture of continuous improvement in all activities.

Students expectation through OBE –

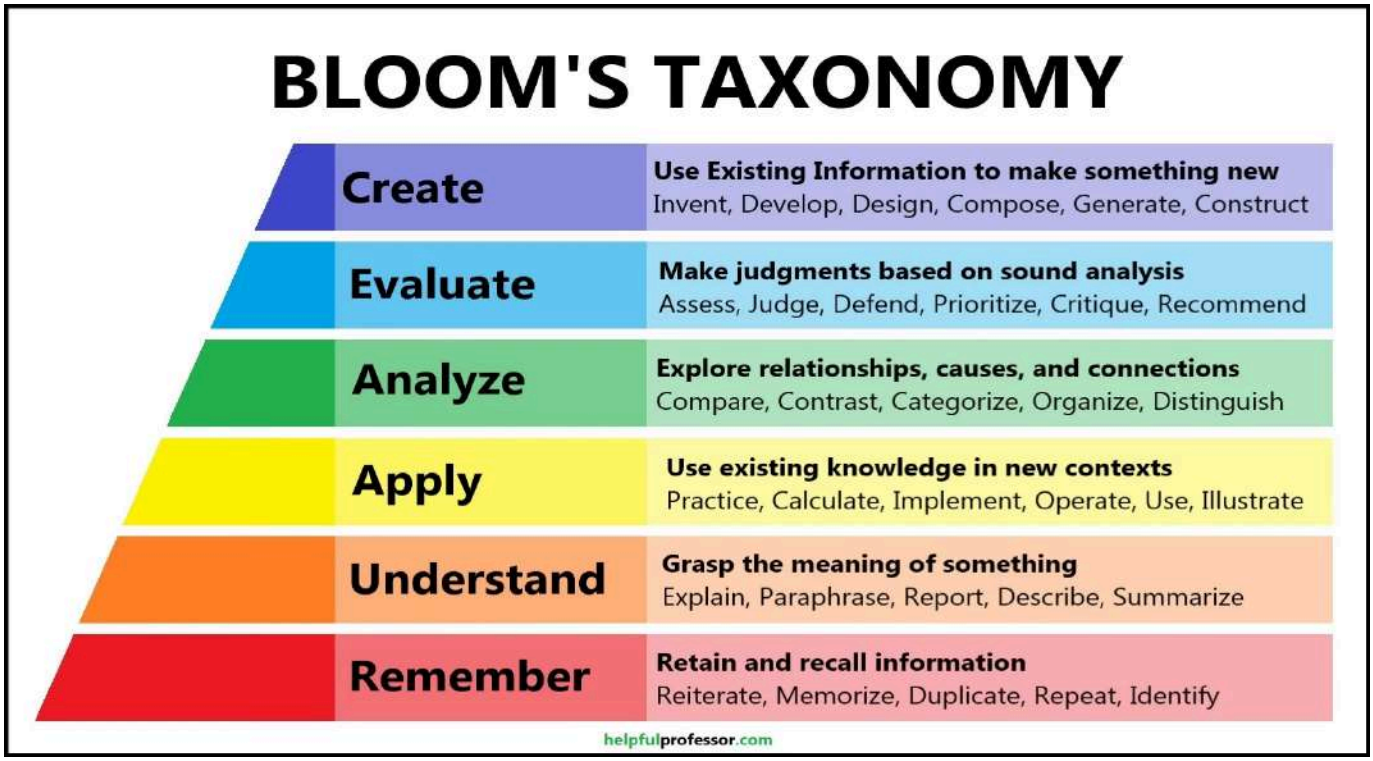
- Students expect more personalized, transparent, and practical educational experience.
- Students must express themselves by learning and presenting project proposals, case studies analysis, and reports of various activities.
- Be more expressive of their abilities to think, question, and make decisions based on the findings.
- Students should get hands-on experience through industrial training.

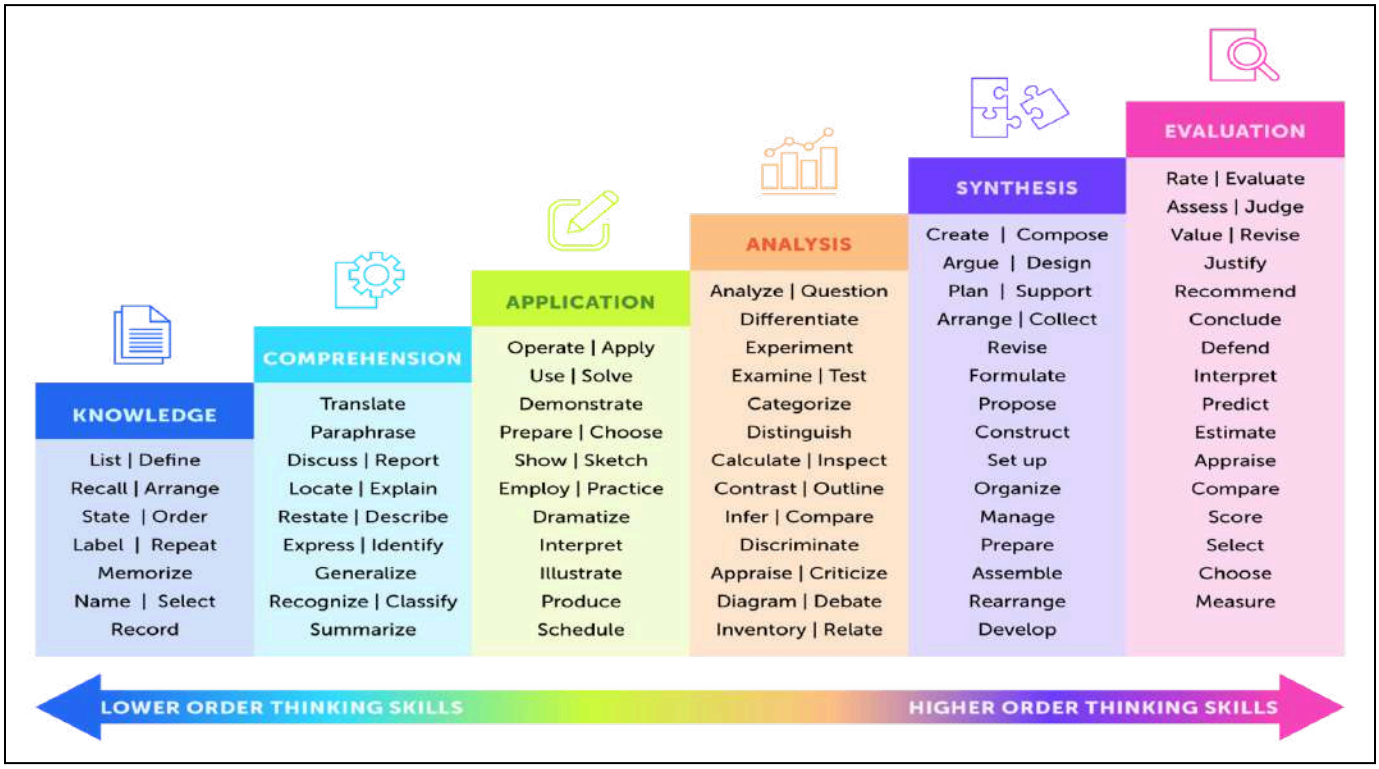


OBE framework



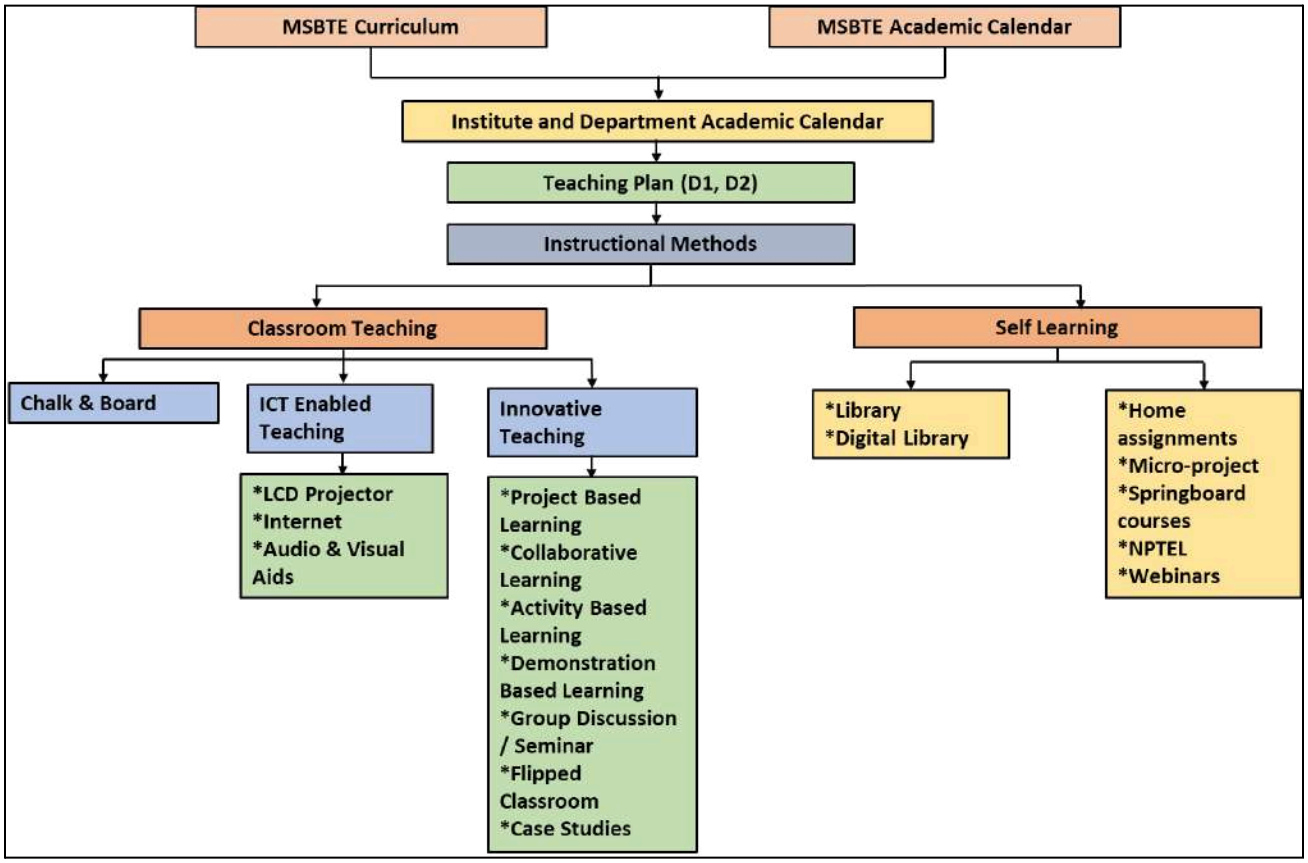
Revised Bloom's Taxonomy:-





LOTS **HOTS**

Teaching Learning Process:-



TEACHING-LEARNING PROCESS & IMPLEMENTATION

TEACHING-LEARNING PROCESS & IMPLEMENTATION

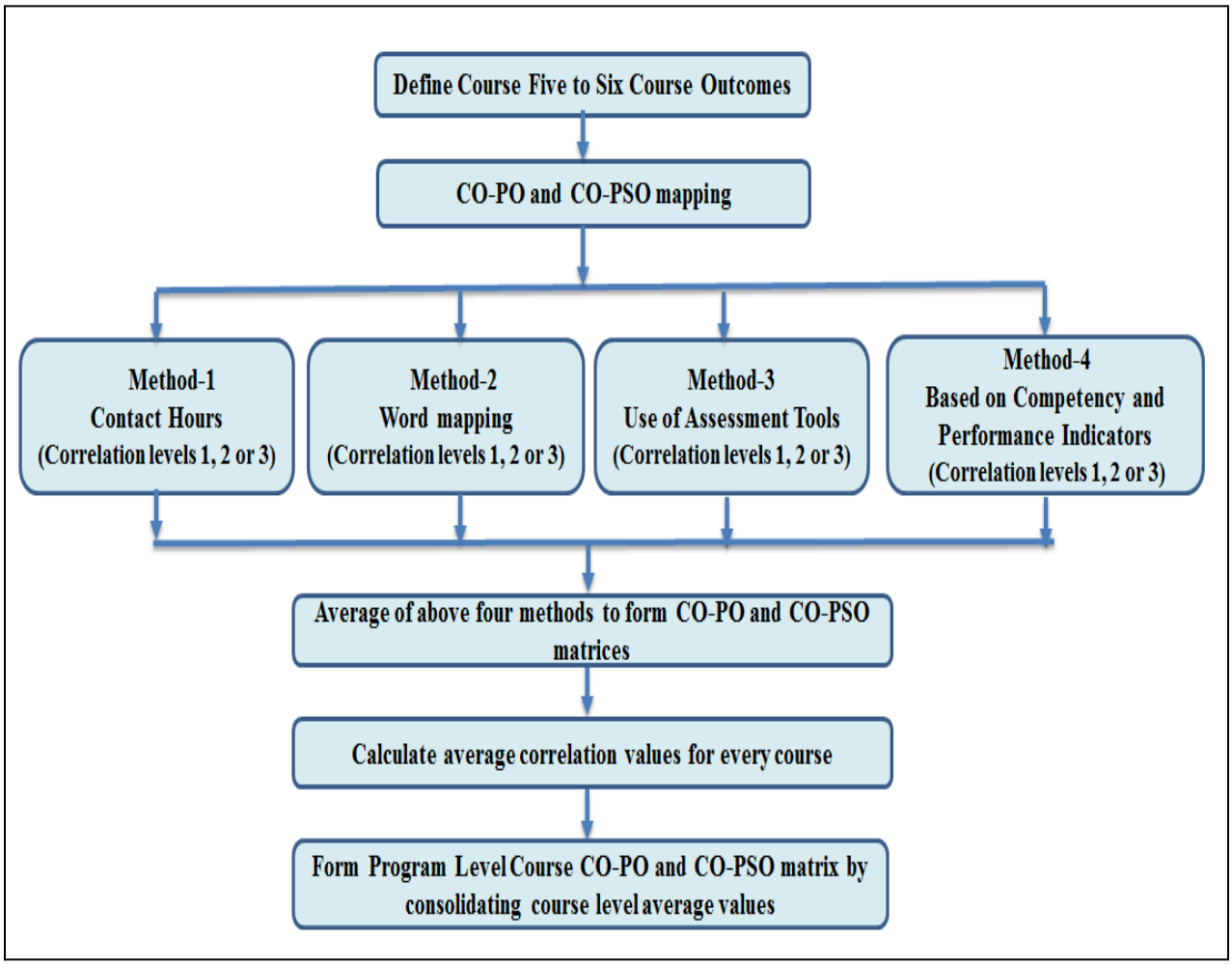
SPCFMBE FOR COs FOR MULATION/REFINEMENT

Employable – Placement, Higher Education and Entrepreneurs	E
BT Level – Progressing towards HOTs	B
Measurable – Blooms Taxonomy Action Verb	M
Formative Assessment – Progressive and continous	F
Comprehend - Inferred CO, PO and PSO's	C
Purpose – Objective or Indented Outcome	P
Specific –Course or Program Specific	S

CONTENT BEYOND SYLLABUS

- Expert Lecture
- Alumni Profiles and interaction
- Communication Skill
- Workshops
- Projects
- Virtual Lab
- Internship
- Industrial Visit
- Field Visit for Social Life Skill

Process of CO-PO mapping:-



Sample articulation matrix showing the CO-PO mapping-

CO – PO Mapping-

All the courses together must cover all the PO's.

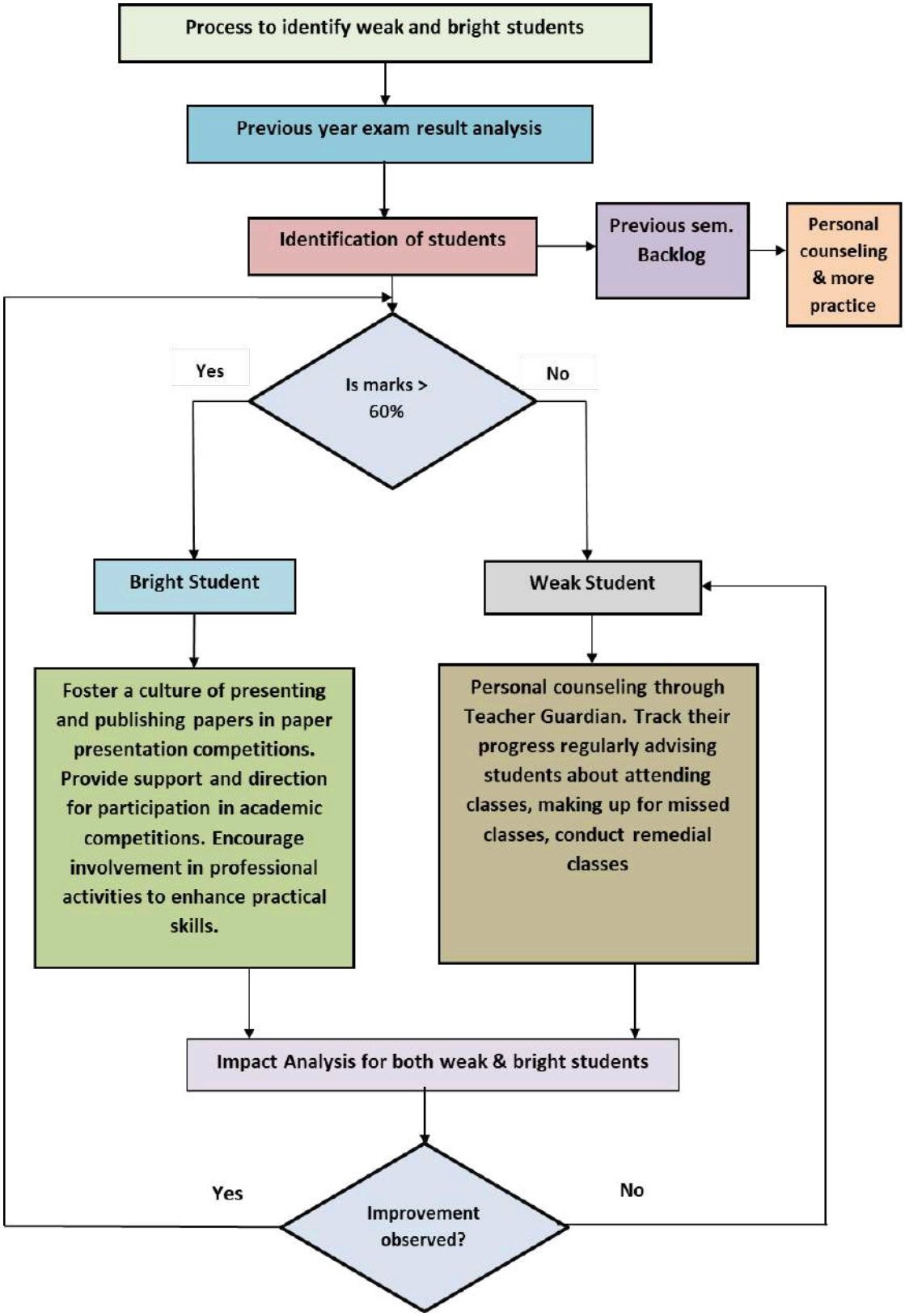
For a course map the CO to PO through the CO-PO matrix with a measure of correlation.

The various correlation levels are:

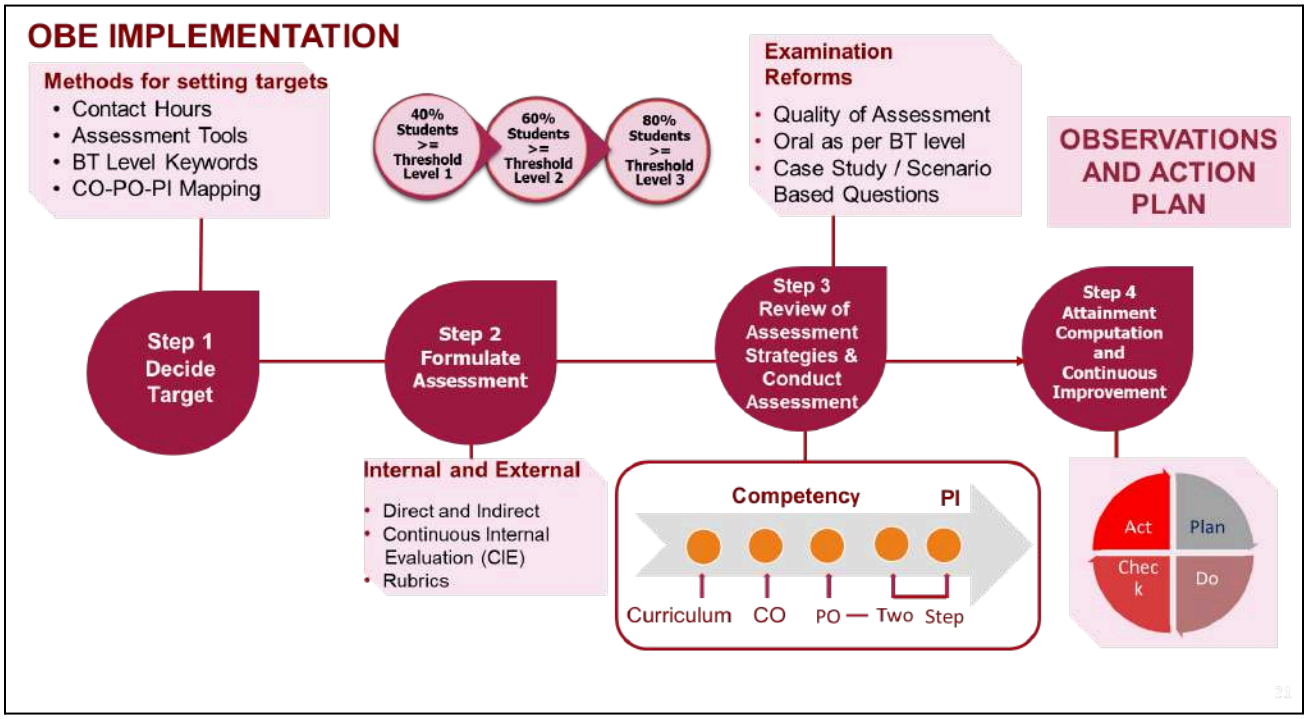
1	**Slight (Low) Correlation**
2	**Moderate (Medium) Correlation**
3	**Substantial (High) Correlation**
--	**indicates there is no correlation.**

C301	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
C301.1	3	3	2	2	2	-	2	2	2
C301.2	3	3	2	-	2	1	2	3	3
C301.3	2	2	2	2	2	2	2	2	2
C301.4	2	2	2	2	2	2	2	2	2
C301.5	2	2	2	1	2	2	1	2	2
Average	**2.40**	**2.40**	**2.00**	**1.75**	**2.00**	**1.75**	**1.80**	**2.20**	**2.20**

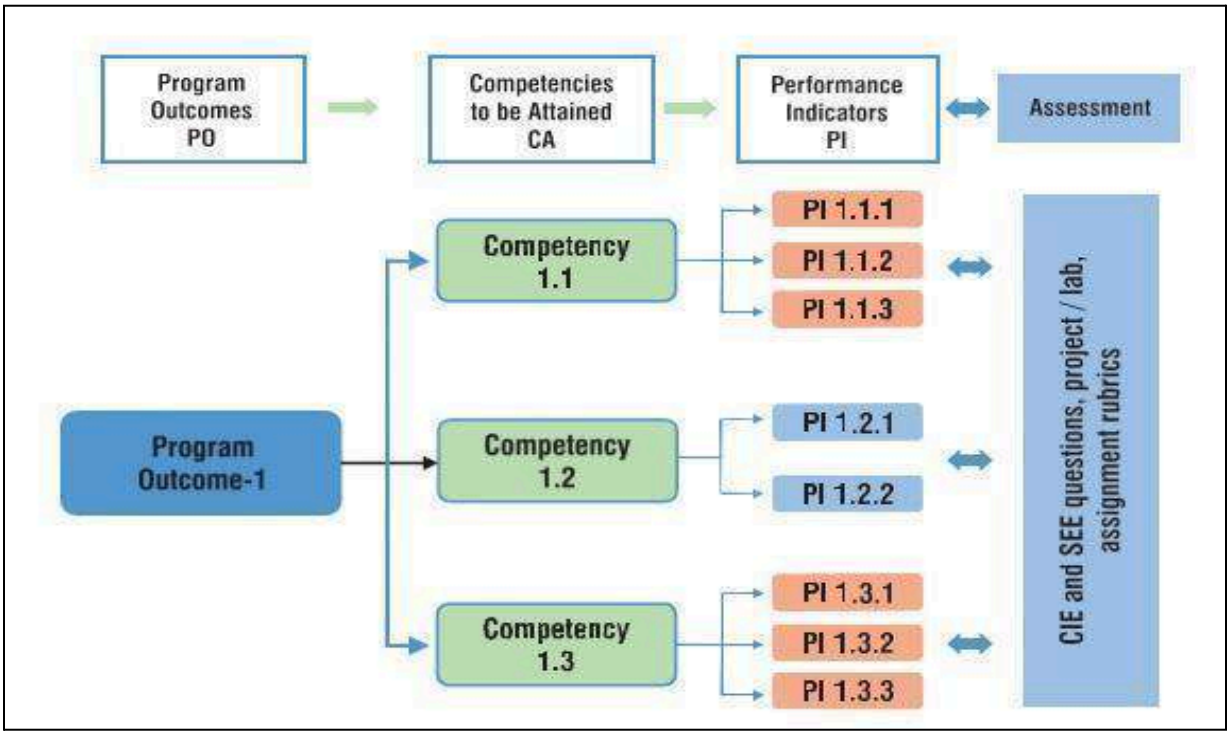
Process of Identification of Weak and Bright Students-



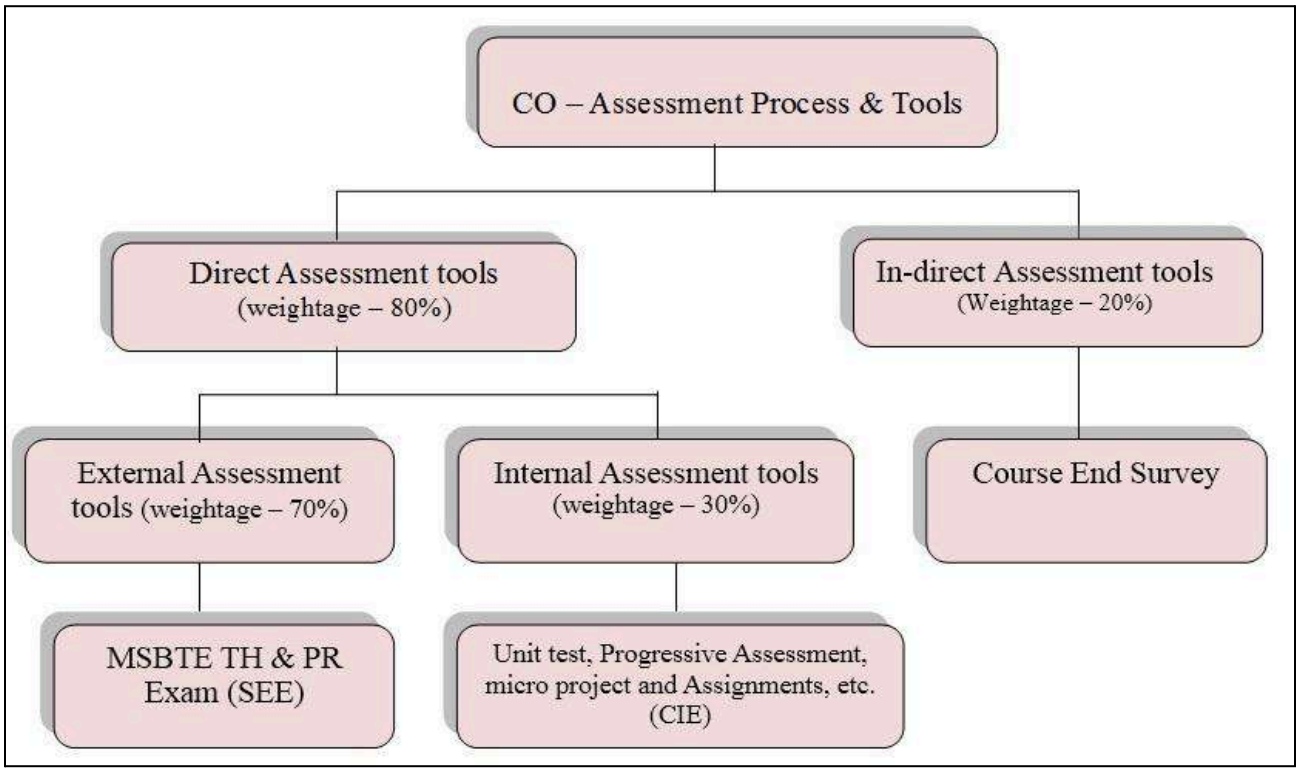
OBE Implementation:



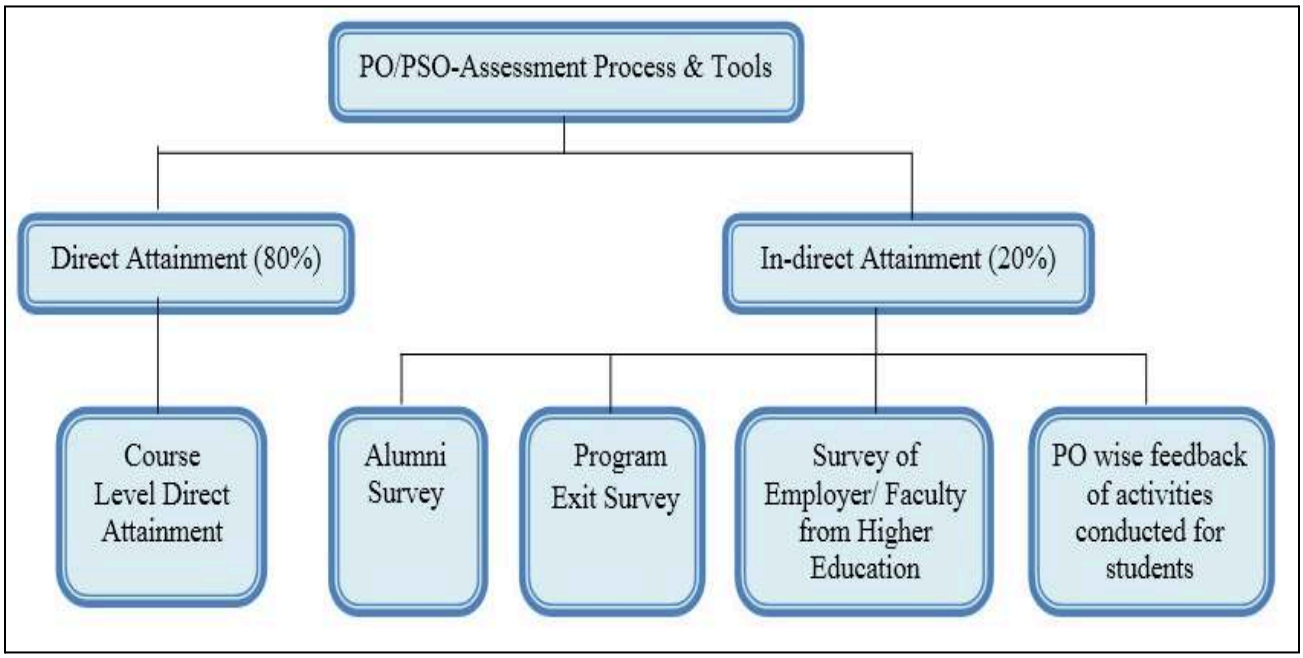
CO-PO-PI Mapping:



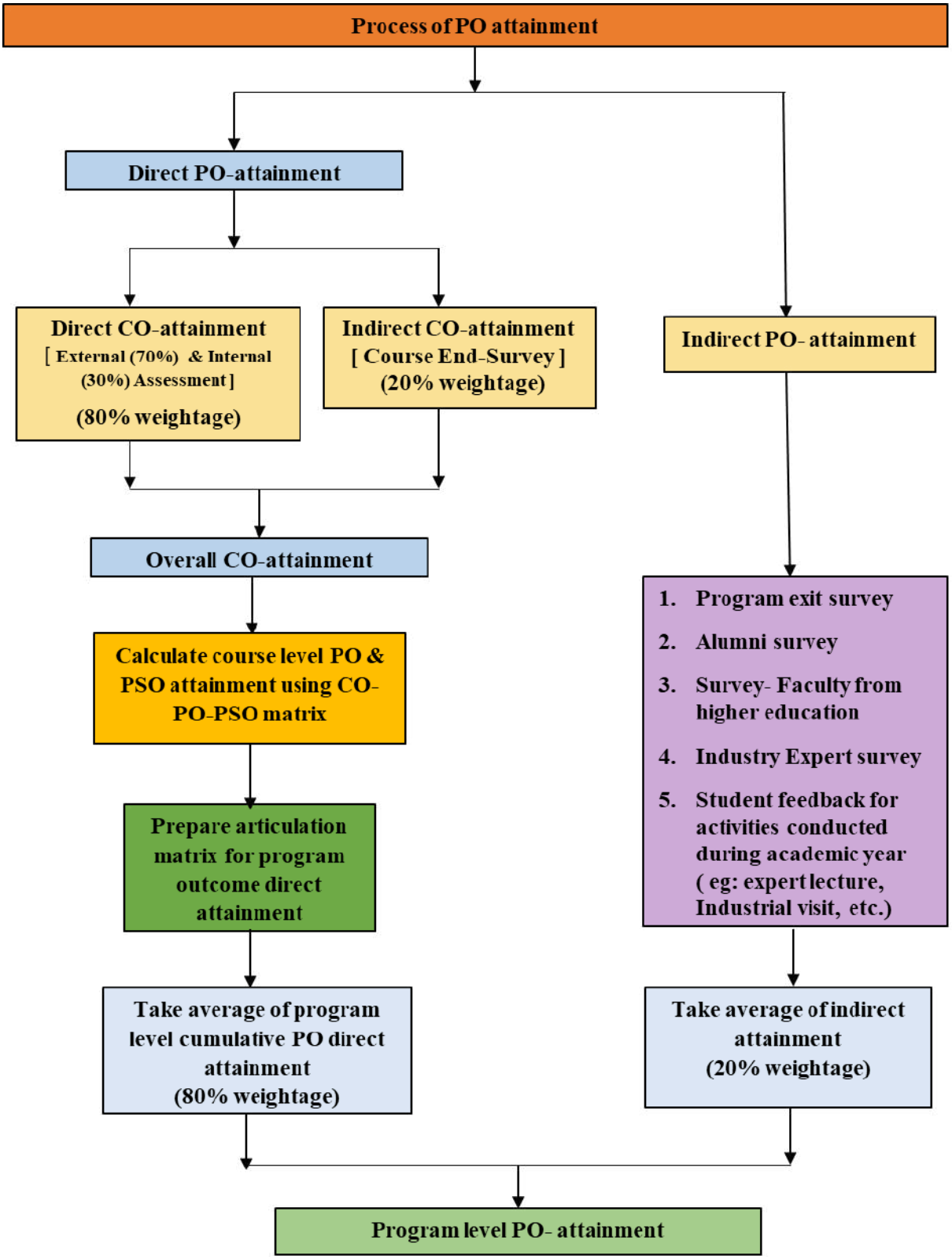
Process of CO-Assessment :



Process of PO and PSO-Assessment :



Process of PO Attainment :



CO Attainment Calculations

Attainment Weightage-

PO Direct Assessment (80%)				
CO Direct Assessment-				
Sr.No.	**Assessment Tools used**	**Details**	**Evaluation Criteria**	**Weightage**
External Assessment tools:				
1.	MSBTE Theory Exam (TH-ESE)	Written Examination	According to CO-PO and Mapping & BT level	70 marks
2.	MSBTE Practical Exam (PR-ESE)	On the basis of Practical performance and oral		25/ 50 marks as per teaching scheme
Internal Assessment tools:				
1.	Unit test 1 & 2 (TH-PA)	Questions based on allotted chapters for the course	According to CO-PO and Mapping & BT level	20/ 30 marks as per teaching scheme
2.	Micro-project (TH-PA)	On the basis of Model and project report prepared		As per teaching scheme
3.	Practical Termwork (PR-PA)	On the basis of timely submission of manual		As per teaching scheme
4.	Assignments	Questions based on the respective chapter covered		As per course teacher

PO In-direct Assessment (20%)			
Sr. No.	**Assessment Tools used**	**Details**	**Weightage**
1.	Survey	Course Exit Survey	As per course teacher

Sample CO-PO attainment Calculation-

For Direct CO attainment, calculation for External Semester End Exam marks (SEE)
The table below shows marks of students for SEE,

Name of Institute: **Y B Patil Polytechnic, Akurdi.**
Name of Department: **Electronics & Communication Engineering**
Class: **ET5I**
Acedemic Year: **2023-2024**
Name of Course: Industrial Automation (IAU-22534)

		W-2023	Threshold	60
Sr. No	Enrollment No	Name of Student	Course - IAU	
			Semester End Exam/External Assessment (SEE)	
			TH (ESE)	PR (ESE)
		Marks------>	70	25
1	2101340199	PATIL AYUSH SANTOSH	57	24
2	2101340202	DISHA KSHIRSAGAR	57	20
3	2101340205	KADAM KALPESH	54	22
4	2101340208	SHINDE MAYUR ASHOK	39	20
5	2101340210	SHAIKH MUAVEEZ	40	22
6	2101340212	PRATHAMESH SHIVAJI	54	21
7	2101340213	SAPKAL RUPESH RAJESH	59	21
8	2101340214	SELUKAR SAHIL	46	20
9	2101340217	RAIEN SALIM	53	20
10	2101340223	KULKARNI SHUBHAM	44	22

Total number of students	32
Number of students achieving 42 or more marks	24
% of students achieving 42 or more marks	No. of students achieving greater than 42 marks = 75%

Threshold as per MAX. marks	42.00	15.00
No. of students appeared	32	31
COUNT >=Threshold	24	31
%COUNT	75.00	100.00
Avg.%	87.5	
Level of Attainment	3.0	

Let's say threshold is, if MSBTE TSI>40, then threshold is 60
if MSBTE TSI<40, then threshold is 40

In this case, MSBTE TSI is 46.49, hence threshold considered is 60
And Level of attainments are,
Level 1- 1-40% students scoring more than threshold marks
Level 2-60% students scoring more than threshold marks
Level 3- 80% students scoring more than threshold marks

As average percentage is greater than 80, attainment level is 3

For Direct CO attainment, calculation for CO wise Continuous Internal Assessment (CIE)

The table below shows marks of students for CIE,

Name of Institute: **Y B Patil Polytechnic, Akurdi.**
Name of Department: **Electronics & Communication Engineering**
Class: **ET5I**
Acedemic Year: **2023-2024**
Name of Course: Industrial Automation (IAU-22534)

W-2023

Sr. No	Enrollment No	Name of Student	Continuous Internal Assessment (CIE)																			
			CT 1	CT 1	CT 1			CT 2	CT 2		A1	A2	A3	A4	A5							
			CO1	CO2	CO3	Total	CO3	CO4	CO5	Total	CO1	CO2	CO3	CO4	CO5	CO1	CO2	CO3	CO4	CO5	Micro Proj	PR (PA) D3
		Marks---->	8	16	8	32	10	12	10	32	10	10	10	10	10	18	26	28	22	20	10	25
1	2101340199	PATIL AYUSH SANTOSH	6	14	0	20	4	8	8	20	10	10	10	9	9	16	24	14	17	17	9	23
2	2101340202	DISHA KSHIRSAGAR	6	10	4	20	4	8	6	18	10	8	8	9	9	16	18	16	17	15	8	22
3	2101340205	KADAM KALPESH	6	8	4	18	4	8	6	18	10	8	8	9	9	16	16	16	17	15	9	23
4	2101340208	SHINDE MAYUR ASHOK	6	7	4	17	4	10	4	18	9	8	9	7	8	15	15	17	17	12	8	21
5	2101340210	SHAIKH MUAVEEZ IRSHAD	5	8	4	17	6	6	4	16	10	8	9	9	9	15	16	19	15	13	8	21
6	2101340212	PRATHAMESH SHIVAJI KOTE	4	11	4	19	4	6	6	16	9	8	8	8	8	13	19	16	14	14	7	23
7	2101340213	SAPKAL RUPESH RAJESH	6	8	4	18	6	6	8	20	9	8	8	8	8	15	16	18	14	16	9	23
8	2101340214	SELUKAR SAHIL SAHEBRAO	8	6	2	16	2	10	6	18	10	4	4	4	4	18	10	8	14	10	7	20
9	2101340217	RAJEN SALIM MOHAMMED	3	10	4	17	6	5	7	18	9	8	8	8	8	12	18	18	13	15	7	20
10	2101340223	KULKARNI SHUBHAM	4	11	4	19	4	10	4	18	9	8	8	8	8	13	19	16	18	12	9	21

Total number of students	32				
CO	CO1	CO2	CO3	CO4	CO5
Number of students achieving more than average marks for each CO	20.00	18.00	18.00	20.00	17.00
% of students achieving more than average marks for each CO	63.28	60.16	60.16	63.28	58.59
Level of attainment	2.10	2.00	2.00	2.10	1.90

Level of attainments are,

Level 1- 1-40% students scoring more than Average marks

Level 2-60% students scoring more than Average marks

Level 3- 80% students scoring more than Average marks

Final course attainment is calculated by considering 80% of CO direct attainment + 20% of indirect attainment

Final Course Attainment

(Semester End Exam-SEE CALCULATIONS)

CO Attainment	CO1	CO2	CO3	CO4	CO5
Direct Attainment from External assessment	3.00	3.00	3.00	3.00	3.00
70% of SEE	2.10	2.10	2.10	2.10	2.10

CIE CALCULATION

CO Attainment	CO1	CO2	CO3	CO4	CO5
Direct Attainment from Internal assessment-Microproject, PR(PA) & Class Test	2.1	2	2	2.1	1.9
30% of CIE	0.63	0.60	0.60	0.63	0.57

(SEE+CIE)

CO Attainment	CO1	CO2	CO3	CO4	CO5
Direct Attainment (70%+30%)	2.73	2.70	2.70	2.73	2.67
80% of CO direct attainment	2.18	2.16	2.16	2.18	2.14

CO-Indirect Attainment (As per Course Exit Survey-)					
Level marked by students	CO1	CO2	CO3	CO4	CO5
	No.of students marked particular level				
1(Satisfactory)	5	3	3	2	1
2 (Good)	7	5	8	6	6
3 (Excellent)	20	24	21	24	25
Total Responses	32	32	32	32	32
Level of attainment	2.47	2.66	2.56	2.69	2.75
20% of CO indirect	0.5	0.5	0.5	0.5	0.6

Total CO attainment					
80% of CO direct attainment	2.18	2.16	2.16	2.18	2.14
20% of CO indirect	0.5	0.5	0.5	0.5	0.6
Total Attainment	2.68	2.69	2.67	2.72	2.69

For final PO attainment considering CO-PO-PSO matrix and CO attainment matrix, PO wise CO attainment calculations are done by using formula for each row and column

[C505.1-PO1.1 Row] *CO1/3= 1*2.68/3=0.89
[C505.2-PO1.2 Row] *CO2/3= 2*2.69/3=1.79
[C505.3-PO1.3 Row] *CO3/3= 2*2.67/3=1.78
[C505.4-PO1.4 Row] *CO4/3= 2*2.72/3=1.81
[C505.5-PO1.5 Row] *CO5/3= 1*2.69/3=0.90
Final attainment for PO1, by taking average of all above calculated value= 1.44

Final PO Attainment

CO Attainment	CO1	CO2	CO3	CO4	CO5
Total CO Attainment (Direct + Indirect)	2.68	2.69	2.67	2.72	2.69

CO-PO-PSO matrix

C505	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
C505.1	1	2	1	2	-	2	2	-	-
C505.2	2	2	2	3	-	2	2	2	2
C505.3	2	2	2	3	-	2	3	2	2
C505.4	2	2	2	2	-	-	2	2	2
C505.5	1	2	1	2	-	2	2	-	-
Average	1.60	2.00	1.60	2.40	-	2.00	2.20	2.00	2.00

[C505.1-PO1.1 Row] *CO1/3 [C505.2-PO1.2 Row] *CO2/3

PO-wise CO Direct Attainment Calculation

C505	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
C505.1	0.89	1.79	0.89	1.79	-	1.79	1.79	-	-
C505.2	1.79	1.79	1.79	2.69	-	1.79	1.79	1.79	1.79
C505.3	1.78	1.78	1.78	2.67	-	1.78	2.67	1.78	1.78
C505.4	1.81	1.81	1.81	1.81	-	-	1.81	1.81	1.81
C505.5	0.90	1.79	0.90	1.79	-	1.79	1.79	-	-
AVERAGE CO Direct attainment	1.44	1.79	1.44	2.15	-	1.79	1.97	1.80	1.80

Contribution of CO in PO attainment and Continuous Improvement-

Outcome	Action to be taken by faculty
All CO-PO attained highly (>2 out of 3)	Set new higher targets or attainment levels for next Academic Year
All CO-PO attained moderately (1 to 1.99 out of 3)	Record observations, Continue action plan of previous academic year with a plan for improvements.
All CO-PO attained lowly (< 1 out of 3)	Record observations, assess the target set, revise/improve action plan of the previous academic year to achieve the attainment with a plan for improvements.

Faculty Portfolio-

The following documents shall be prepared and produced (when required) by each faculty

- Course file
- Personal file
- Academic Calendar (MSBTE)
- Individual Time Table
- Course Curriculum
- Teaching Plan of Theory /Practical
- Progressive Assessment sheets
- List of Micro Projects Allocated to Students
- CO-wise data of all internal assessment tools. (Class Test, TW, Microprojects & any other tools)
- Result analysis of term end examination
- CO-PO-PSO attainment Semiautomatic excel sheet
- Sample term work/ micro project record/Class test papers/Assignments
- Innovation in teaching-learning process
- Content beyond syllabus for Theory and Practical
- Records of portfolios assigned by HOD

Program Outcome (POs) -

PO1: Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the broad based problems.

PO2: Problem analysis: Identify and analyse well-defined problems using codified standard methods.

PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

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