



YASHODA COLLEGE OF ARCHITECTURE

Assessment and Attainment Manual for Outcome based Education



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Vision

- To empower the students with knowledge, Values, Skills, Innovative / Creative lateral thinking and meet the educational, social, global, environmental and economic needs of the region and nation to create Humane Society.

Mission

- To impart quality education & training to students for shaping their career with providing opportunities to students & faculty and continuous learning opportunities.
- To empower the students with recent knowledge, skills and right attitude in order to meet the challenges of future by guidance, seminars & lecture's as well as Environmental issues.
- To generate new knowledge and promote excellence in research and extension activities.
- To make efforts for the spread of technical education among classes and communities, which are socially and educationally underprivileged specifically for rural areas.

Internal Quality Assurance Objectives

- Providing World class infrastructure with personal attention, offering resources and opportunities for future architects to enhance their professional skills, stay updated with industry trends, and fulfill continuing education requirements
- Providing comprehensive education and training programs for aspiring architects to develop their technical skills, design proficiency, and theoretical knowledge.
- Involvement in innovation and research by promoting research activities to advance architectural knowledge, explore new materials, construction techniques, sustainability practices, and design methodologies.



- Providing ethical and moral base education by emphasizing ethical principles and professional standards in architecture, including sustainability, social responsibility, and the ethical conduct of architectural practice.
- Incorporate controlled assessments and coursework to systematically evaluate and cultivate essential architectural skills, fostering practical application, problem-solving, and design proficiency within a structured framework.
- Facilitating networking opportunities among architects, students, professionals, and related industries to foster collaboration, exchange ideas, and create a supportive professional community.

Program Outcomes

Architecture Graduate will be able to –

PO 1.Architectural 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, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3.Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specific needs with appropriate consideration for the public health and safety, and the cultural, social, and environmental considerations

PO4.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.

PO5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. Social responsibility of an architect: 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



PO7. 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.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. 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.

PO11. 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

PO12. 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.

Program Specific Outcomes

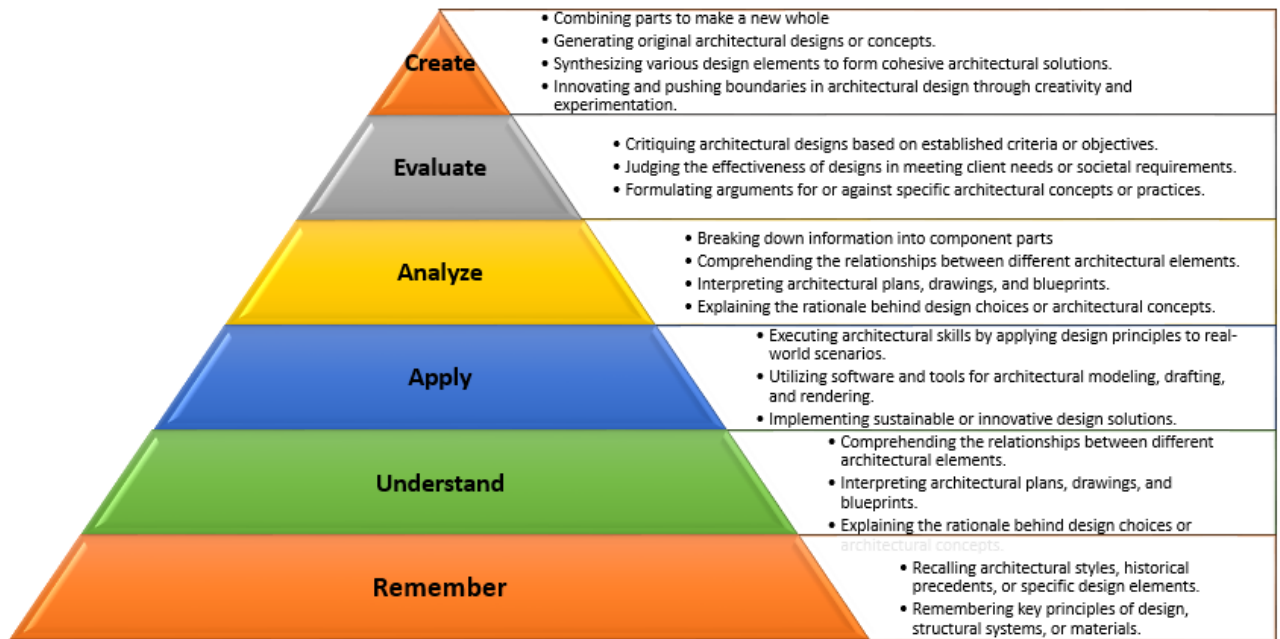
PSO1. Professional Skills: Apply the knowledge of natural condition of site and environment, history and cultural context, building material, construction techniques and services, structural mechanics and building economics to design buildings rationally for user and environment friendly

PSO2. Collaborative Skills: Skill development for communication and collaborative works

PSO3. Problem-Solving Skills: Apply creative ideas, principles, theory rationally. Apply appropriate methods, media and modern technology to resolve architectural and multidisciplinary research.



Bloom's Taxonomy



- **Remembering:**
 - Recalling architectural styles, historical precedents, or specific design elements.
 - Remembering key principles of design, structural systems, or materials.
- **Understanding:**
 - Comprehending the relationships between different architectural elements.
 - Interpreting architectural plans, drawings, and blueprints.
 - Explaining the rationale behind design choices or architectural concepts.
- **Applying:**
 - Executing architectural skills by applying design principles to real-world scenarios.
 - Utilizing software and tools for architectural modeling, drafting, and rendering.
 - Implementing sustainable or innovative design solutions.
- **Analyzing:**
 - Breaking down architectural designs to evaluate their components and functionalities.
 - Assessing the effectiveness of designs in terms of functionality, aesthetics, and cultural significance.
 - Comparing and contrasting different architectural approaches or solutions.



- **Evaluating:**
 - Critiquing architectural designs based on established criteria or objectives.
 - Judging the effectiveness of designs in meeting client needs or societal requirements.
 - Formulating arguments for or against specific architectural concepts or practices.
- **Creating:**
 - Generating original architectural designs or concepts.
 - Synthesizing various design elements to form cohesive architectural solutions.
 - Innovating and pushing boundaries in architectural design through creativity and experimentation.



Assessment and Attainment Manual for Architectural Education

1. Introduction

- Overview of Outcome-Based Education (OBE) in Architectural Studies.
- Explanation of the purpose and significance of the Assessment and Attainment Manual.
- Alignment of assessments with learning outcomes specific to architectural education.

2. Principles of Assessment in Architectural Outcome-Based Education

- **Learning Outcomes Clarity:** Define the specific learning outcomes for architectural programs/courses.
- **Authenticity:** Emphasize the authenticity of assessments in replicating real architectural challenges.
- **Comprehensive Evaluation:** Explain the need for a multifaceted assessment approach covering various aspects of architectural skills (design, technical proficiency, communication, etc.).
- **Continuous Improvement:** Stress the importance of using assessment results for continuous improvement of the curriculum and teaching methodologies.

3. Components of Assessment

- **Design Projects:** Description of how design projects will be assessed, considering creativity, functionality, sustainability, and adherence to architectural principles.
- **Technical Skills:** Assessment criteria for technical skills, such as software proficiency, construction techniques, and material knowledge.
- **Presentation and Communication:** Criteria for evaluating presentation skills, visual communication, and the ability to articulate design concepts effectively.
- **Collaboration and Professionalism:** Assessing teamwork, leadership, and professional ethics in architectural practice.

4. Assessment Methods and Tools

- **Rubrics:** Sample rubrics for each assessment component to ensure consistent and objective evaluation.
- **Portfolio Assessment:** Guidance on creating and evaluating student portfolios showcasing their architectural work.

5. Assessment Implementation

- **Timelines and Deadlines:** Establishing timelines for assessments and submission deadlines.



- **Feedback and Evaluation:** Procedures for providing timely and constructive feedback to students.
- **Moderation and Quality Assurance:** Ensuring the reliability and validity of assessments through moderation and quality assurance measures.

6. Continuous Improvement and Adaptation

- **Data Analysis:** Utilizing assessment data to identify areas for improvement in the curriculum and teaching methods.
- **Stakeholder Feedback:** Incorporating feedback from stakeholders (students, faculty, industry experts) for refining assessment strategies.
- **Adapting to Industry Trends:** Regularly updating assessments to align with evolving trends and practices in the architectural field.

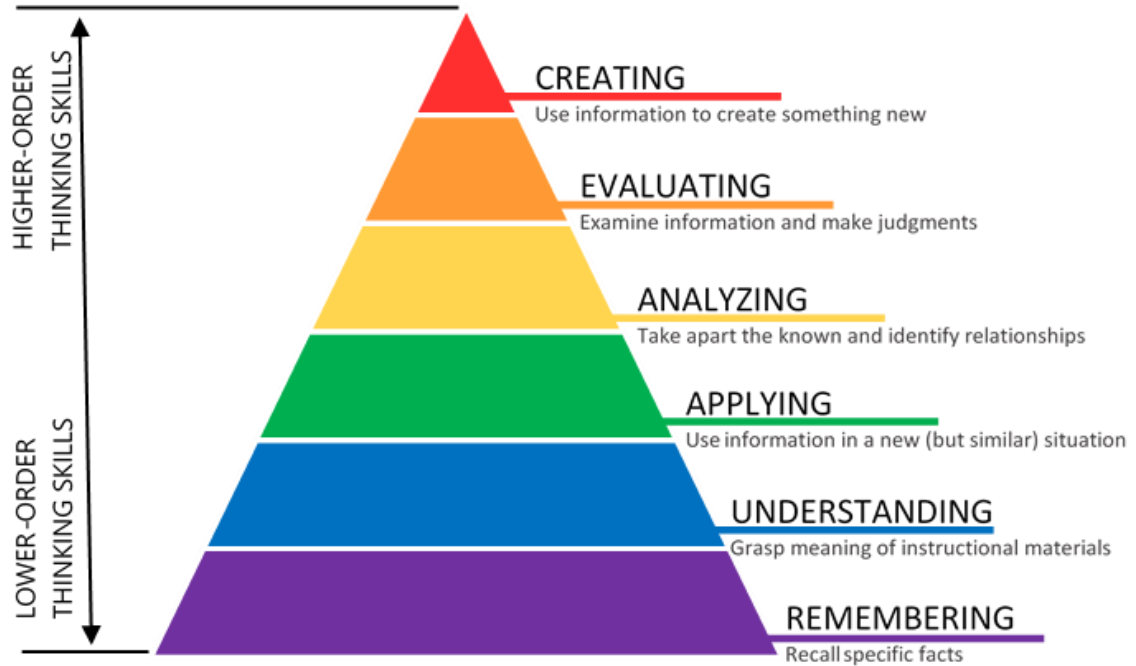
7. Conclusion

Reiterate the importance of aligning assessments with learning outcomes in architectural education.

Encourage faculty and staff to actively engage in refining and improving assessment methodologies.

Appendices

Include sample rubrics, assessment templates, and any additional resources relevant to the assessment process.



01	02	03	04	05	06
KNOWLEDGE:	UNDERSTAND:	APPLY:	ANALYZE:	EVALUATE:	CREATE:
Define, Identify, Describe, Recognize, Tell, Explain, Recite, Memorize, Illustrate, Quote	Summarize, Interpret, Classify, Compare, Contrast, Infer, Relate, Extract, Paraphrase, Cite	Solve, Change, Relate, Complete, Use, Sketch, Teach, Articulate, Discover, Transfer	Contrast, Connect, Relate, Devise, Correlate, Illustrate, Distill, Conclude, Categorize, Take Apart	Criticize, Reframe, Judge, Defend, Appraise, Value, Prioritize, Plan, Grade, Reframe	Design, Modify, Role-Play, Develop, Rewrite, Pivot, Modify, Collaborate, Invent, Write



Process to maintain Quality of the Course Outcomes

1. After the course (subject) allotment from the department, identify the expected learning outcomes from the course i.e. what knowledge or skills from this course will students will acquire to perform well in the future. Make a list of learning outcomes first.
2. Look over the list and check the most important learning outcomes.
3. Identify 4 to 6 most important learning outcomes from the course using the action verbs of learning levels.
4. It should be related to the skills, knowledge, and behavior that students will acquire through the course.
5. Check how clear and how important is the statements of outcomes for the students?
6. How many are on the list of key competencies of program outcomes?
7. Existing COs are revised upon feedback from stakeholders or during the cycle of Curriculum review.

CO-PO Mapping Guidelines

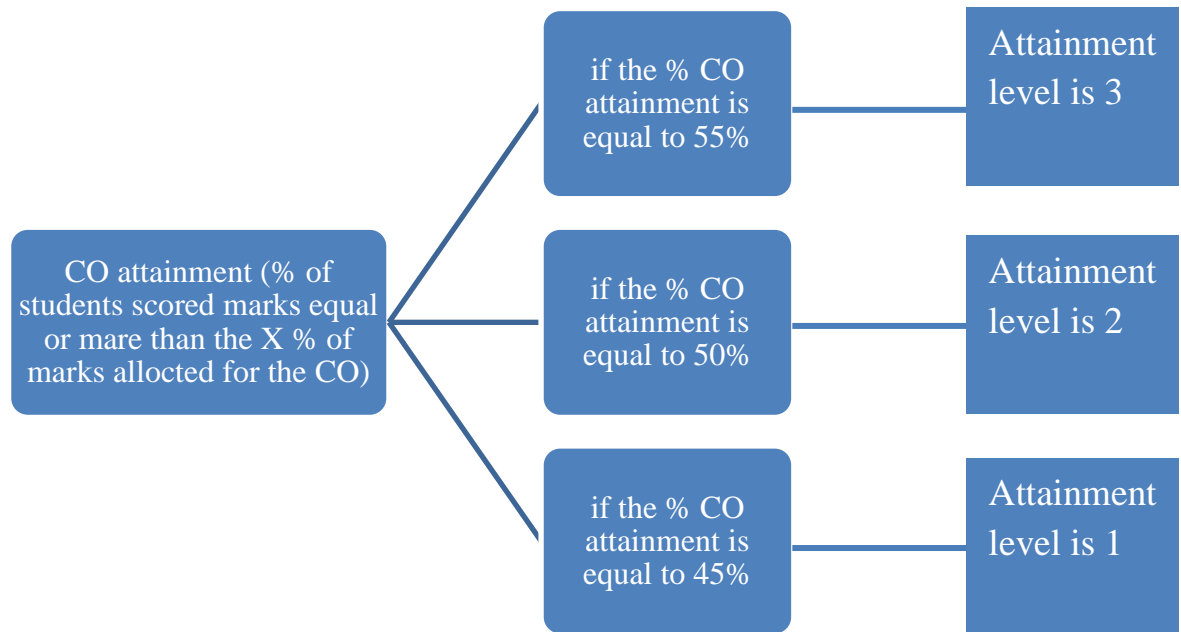
- Most of the time, the appropriate keyword of PO and CO is sufficient for mapping. The various mapping levels for the COs and POs mapping is assigned on a four-point scale: ‘-’ or Empty cell is No Correlation, ‘1’ is Slight Correlation (Low level), ‘2’ is Moderate Correlation (Medium level) and ‘3’ is Substantial Correlation (High level).
- In order to complete the CO-PO articulation matrix, the first step is to identify the keywords of POs/PSOs to each CO and then make a corresponding mapping table assigning correlation levels at the corresponding cell.
- These correlation level to CO-PO matrix can be assigned as given in Table below:
-

Action verb/ Keywords Used in Writing COs	Mapping Level
Keywords/action verb of the Course Outcome is not related to the action verb of Program Outcomes	‘-’ or Empty cell
Part of PO is reflected through keywords/action verbs of CO	‘1’ (Low)
Major part of PO is reflected through keywords/action verbs and moderate level performance is expected from student to achieve CO	‘2’ (Medium)
Exact action verb of PO and critical performance expected from student to achieve CO	‘3’ (High)



Level of attainment

Here 3 levels of attainment are taken as 1-Low; 2-medium; 3- High. These 3 levels of attainment can be defined as:



Procedure for computation of CO attainment

Course outcomes will be attained through direct and indirect methods.

- Direct Attainment:
 - Mid Term Test/End Term Test
 - Attendance
 - General Performance
 - University Exam

The proportional weightages of the above criteria are as per the institute academic regulations.

- Indirect Attainment:
 - Course Exit Survey(Feedback from student on the framed questionnaires)

Direct Assessment tools

1. The various internal assessment tools should be in alignment with the COs for different subjects.



2. Question paper should be so set to assess all CO's. The marks obtained in assessments against items for each CO will indicate the CO attainment.
3. Faculty can set targets for each CO of his/her course Attainment gaps can therefore be identified
4. Faculty can plan to reduce the attainment gaps or enhance attainment targets.

A common format of programmed excel sheet, prepared in the Institute, is initially being used for finding the attainment of COs. Each course faculty computes the attainment as per the appropriate assessment tools considered. Once the marks of each student in internal assessment tests and assignments and other internal evaluation metrics are entered, the CO attainment can be measured for each class.

Measurement CO attainment

The Course Outcome (CO) is measured through the performance of students in the various assessment tools for the particular course. The first step is to collect the marks obtained by the students in each assessment tool.

Computation of % CO attainment

After mapping the questions to the course outcomes, it is required to set the reference or the bench marks for each CO. for example, if it is set to 55%, then all those students will be considered for computation of %CO attainment that has scored greater than or equal to the 55% of maximum marks allocated to that CO.

Once the benchmark/threshold is set, then % attainment is computed by counting the number of students who have reached the benchmark. The formula used for computation of CO attainment by any assessment tool used is

$$\text{Percentage of co attainment} = \frac{\text{Number of students marks equal and above threshold}}{\text{Total number of students appeared in the assessment}} \times 100$$

Procedure for attainment of Cos:

Course outcomes will be attained through direct and indirect methods.

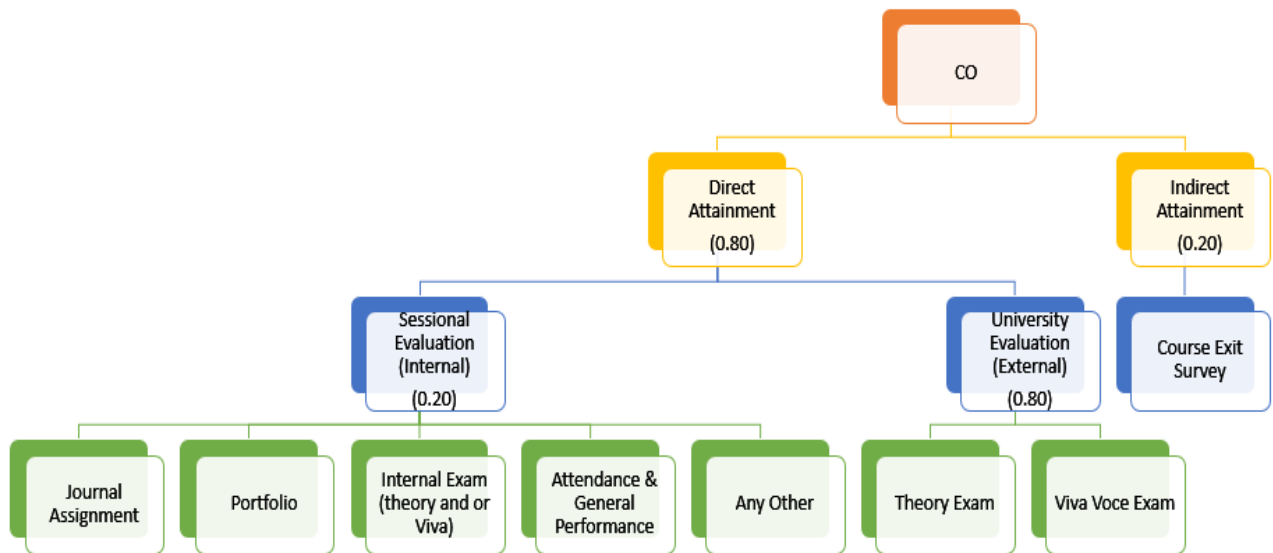
Direct Attainment: consider the following criteria for the direct attainment

- Internal tests will be conducted
- Class performance activities consisting of assignments /tutorials/experiments/quiz/ any other activity related to COs will be conducted
- Attendance and general performance of student will be consider.
- External exam marks will be considered.

Indirect Attainment: In this method, consider the feedbacks of students on the framed questionnaires.



Mechanism of Mapping



Mapping Questions with Course Outcomes at appropriate levels of Bloom's Taxonomy and maps it with assessments

Questions are framed using Bloom's Taxonomy verbs (both during the class test and written assignments) from the remember, understand, apply, analyze, evaluate, and create levels of the taxonomy pyramid. The questions are framed in such a way that it should satisfy Bloom's Taxonomy, wherein each question is mapped to the appropriate course outcome of the respective course, which is evaluated based on the set attainment levels by the department.

Attainment of Program Outcomes and Program Specific Outcomes

- Attainment of POs and PSOs is computed by using direct and indirect assessment methods.
- The direct PO and PSO assessment is through course outcomes attainment, whereas indirect assessment is based on the survey/ feedback obtained from student.

Process for Direct Assessment:

1. CO-PO matrix is developed for each course.
2. The PO attainment for given CO attainment in a course is computed as follows:
 - a. The CO attainment data is multiplied by the mapping strength (1, 2 or 3).
 - b. Above step is repeated for all COs of the course for given PO.
 - c. The weighted COs attainment so obtained are added.



- d. Weighted sum is then divided by the total mapping strength of that PO with all COs of the course.
3. Step a-d are repeated for each PO mapping with the course.
Step 1-3 is repeated for all courses.

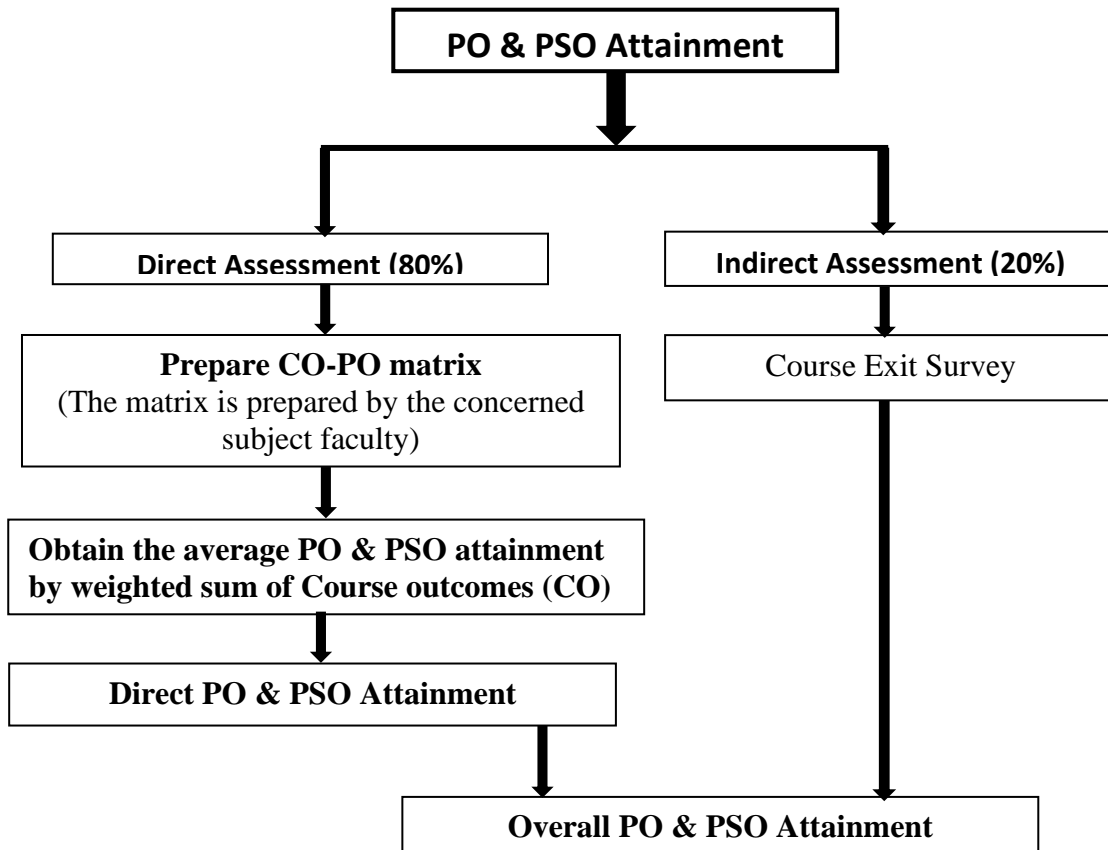
The average of PO attainment in individual Courses is the final direct PO/PSO attainment in the level of 1, 2 &3.

Overall PO/PSO attainment:

Data thus obtained is consolidated and average value is computed. The average value obtained is the final PO attainment. The Overall PO/PSO attainment is calculated using the rubric:



The process adopted for PO & PSO attainment





CO PO Mapping(Sample sheet)

CO-PO Mapping						
POs	CO to PO Mapping	CO1	CO2	CO3	CO4	CO5
Architectural knowledge	PO1	3	3	3	3	2
Problem analysis	PO2			2	2	3
Design/ development of solutions	PO3	2	2	3	3	3
Conduct investigations of complex problems	PO4	1	2	2	2	2
Modern tool usage	PO5	2	2	2	2	3
Social responsibility of an architect	PO6	3	3	3	3	3
Environment and sustainability	PO7	3	3	3		3
Ethics	PO8	2	2	2	2	2
Individual and team work	PO9	3	3	3	3	3
Communication	PO10	3	3	3	3	3
Project management and finance	PO11	3	3	3		2
Life-long learning	PO12	3	3	3	3	3
Professional Skills	PSO1	3	3	3	3	3
Collaborative Skills	PSO2	3	3	3	3	3
Problem-Solving Skills	PSO3	3	3	3	3	3



Continuous Assessment Sheet -Internal Marking (Sample sheet)

Name of Student	CA				Total	Viva
	COs					CO 1 to 5
CO Mapped →	CO1 to 5	CO1 to 3				External
Marks	80	10	5	5	100	100
	50	4	4	3	61	65
	40	2	4	4	50	55
	65	5	4	4	78	70
	52	5	4	4	65	63
	65	8	4	4	81	75
	58	7	4	4	73	68
	57	5	4	4	70	62
	63	7	4	4	78	72
	56	6	4	4	70	60
	66	8	4	4	82	80
	44	4	4	3	55	55
Average Marks	56.00	5.44	4.00	3.82	69.36	65.91
No. of students above avg Marks	7	6	11	9	7	6
% of Students above avg Marks	64	55	100.00	82	64	55
Level	3	3	3	3	3	3



CO Attainment (Sample sheet)

CO Attainment for Course						
Sr. No.	CO→	CO1	CO2	CO3	CO4	CO5
	Assessment Method↓					
Direct methods (80%)						
	Internal Assessment (50% of Direct)					
1	CA	3.0	3.0	3.0	3.0	3.0
	Avg of Internal Assessment (A)	3.0	3.0	3.0	3.0	3.0
	External Assessment (50% of Direct)					
1	Viva	3.0	3.0	3.0	3.0	3.0
	Avg of Ext. Assessment (B)	3.0	3.0	3.0	3.0	3.0
Indirect methods (20%)						
1	Course Exit Survey	2.55	2.73	2.55	2.45	2.73
Average attainment		2.91	2.95	2.91	2.89	2.95



PO/PSO Attainment (Sample sheet)

PO/PSO Attainment							
POs	CO to PO Mapping	CO 1	CO 2	CO 3	CO 4	CO 5	PC
Architectural knowledge	PO1	2.91	2.95	2.91	2.89	1.96	2.72
Problem analysis	PO2			1.94	1.93	2.89	2.25
Design/ development of solutions	PO3	1.94	1.96	2.91	2.89	2.89	2.52
Conduct investigations of complex problems	PO4	0.97	1.96	1.94	1.93	1.93	1.75
Modern tool usage	PO5	1.94	1.96	1.94	1.93	2.89	2.13
Social responsibility of an architect	PO6	2.91	2.95	2.91	2.89	2.89	2.91
Environment and sustainability	PO7	2.91	2.95	2.91		2.89	2.91
Ethics	PO8	1.94	1.96	1.94	1.93	1.93	1.94
Individual and team work	PO9	2.91	2.95	2.91	2.89	2.89	2.91
Communication	PO10	2.91	2.95	2.91	2.89	2.89	2.91
Project management and finance	PO11	2.91	2.95	2.91	0.00	1.93	2.14
Life-long learning	PO12	2.91	2.95	2.91	2.89	2.89	2.91
Professional Skills	PSO1	2.91	2.95	2.91	2.89	2.89	2.91
Collaborative Skills	PSO2	2.91	2.95	2.91	2.89	2.89	2.91
Problem-Solving Skills	PSO3	2.91	2.95	2.91	2.89	2.89	2.91
Average Attainment Per CO		2.6	2.7	2.7	2.4	2.6	