



SHARNBASVA UNIVERSITY, KALABURAGI

(A State Private University, Karnataka)

OUTCOME-BASED EDUCATION (OBE)

IMPLEMENTATION MANUAL-2026

Framework, Processes and Guidelines for

Vision & Mission • PEOs • Curriculum Design • CO–PO–PSO Mapping • Attainment • Continuous Improvement

Abstract

Outcome-Based Education (OBE) is a student-centric educational model that maps and measures students' performance at every stage of the learning process. The OBE model aims to maximize student learning outcomes by developing their knowledge and skills. Also referred to as standards-based education, this approach has proven successful in helping institutions measure learning outcomes while enabling students to develop skills that help them compete with their global counterparts.

This manual presents an overview of OBE as implemented at Sharnbasva University (SUK), followed by the methods used to achieve outcome-based education. It explains the process of defining Program Educational Objectives (PEOs) based on the Vision and Mission of the University, and the subsequent process of defining Course Outcomes (COs). The COs are mapped to Program Outcomes (POs), and the procedures used to attain COs through POs are discussed. Finally, the manual outlines the methods adopted for continuous quality improvement of attainment levels.

1. Vision, Mission, Objectives and Quality Policy

Vision of the University

Sharnbasva University aspires to be the fountainhead of new ideas and of innovators on the bedrock of human values in all spheres of learning.

Mission of the University

Academic Excellence: We strive for academic excellence through innovative and research-intensive education while providing rigorous, relevant, and cost-effective learning experiences for fostering every learner into a global citizen.

Independent Growth: We foster independent thinking, writing, speaking, and living, encouraging freedom of thought, expression, and questioning to develop globally competent individuals who contribute to national development.

Creativity & Entrepreneurship: We nurture creativity, entrepreneurship, and lifelong learning, empowering students to innovate and grow.

Program Development and Delivery: We develop and deliver value-driven academic programs that cater to local, national, and international needs, ensuring relevance and impact.

Partnerships: We cultivate strategic partnerships with academia, business, and community to drive collaborative growth and excellence.

Core Value

"Learning with Values, Leading with Service (Dasoha)"

Objectives of the University

Deliver Value-Based Education: Provide innovative and relevant learning rooted in human values and the spirit of Dasoha (selfless service).

Develop Independent Thinkers: Encourage critical thinking, creativity, and responsible expression for holistic growth.

Promote Innovation & Entrepreneurship: Empower learners to innovate, lead, and contribute meaningfully to society.

Foster Service-Oriented Mindset: Instill the Dasoha philosophy by nurturing compassion, social responsibility, and community engagement.

Ensure Holistic Development: Build ethical values, lifelong learning habits, and global competence.

Strengthen Collaborative Ecosystem: Promote partnerships with academia, industry, and society for inclusive growth.

2. Outcome-Based Education (OBE)

Outcome-Based Education (OBE) is an educational approach that focuses on the desired outcomes of the learning process rather than merely on the delivery of content or completion of courses. It is a result-oriented, student-centred instructional model that aims to develop students who are not only knowledgeable in their field of study but also capable of applying that knowledge to real-world situations. OBE measures student performance based on outcomes – the knowledge, skills, and attitudes acquired during the learning process – by clearly stating what a graduate is expected to attain upon completion of the program.

In the OBE model, the required knowledge and skill set for a particular degree are predetermined, and students are evaluated against these defined outcomes throughout the duration of the program.

Key Features for the Implementation of OBE

- Development of a curriculum framework that defines specific and measurable learning outcomes.
- Use of appropriate instructional methodologies to ensure effective delivery of the specified outcomes.
- Implementation of assessment methods to determine whether students have achieved the defined standards.

Title and Application

These guidelines, referred to as the Outcome-Based Education Guidelines, apply to all students, faculty members, and administrators of the institution.

Objective

The objective of these guidelines is to ensure a fair and reliable evaluation of students' performance, knowledge, and skills against the defined learning outcomes. They also help structure teaching methodologies by evaluating the effectiveness of the teaching process, facilitating continuous improvement through clear, timely, and relevant feedback.

Benefits of Outcome-Based Education

Improved Student Learning Outcomes: The focus on outcomes helps students understand the relevance of their learning and develop the knowledge and skills necessary for success in their future careers.

Increased Accountability: By emphasizing clearly defined outcomes, OBE holds educators and institutions accountable for the quality of education they provide.

Better Alignment with Workforce Needs: OBE ensures that students acquire skills and knowledge that are relevant and in demand in the workforce.

More Effective Assessment: Outcome-based assessment provides a more meaningful evaluation of student learning and offers valuable feedback to both students and educators.

Personalized Learning: OBE recognizes individual learning needs and styles, leading to more personalized and effective learning experiences.

Definitions and Key Components

Outcome-Based Education is a student-centred teaching and learning methodology in which course delivery and assessment are designed to achieve clearly stated objectives and outcomes. It focuses on measuring student performance at various levels of learning. Its important components include:

Course: A theory, practical, or theory-cum-practical subject studied during a semester (e.g., Computer Applications Management).

Course Outcomes (COs): Statements describing the significant and essential learning that students are expected to achieve and demonstrate at the end of a course. Outcomes may be specified for each course based on its credit weightage.

Program: A specialization or discipline within a degree, consisting of an integrated structure of courses along with co-curricular and extra-curricular activities designed to achieve predetermined objectives leading to the award of a degree (e.g., B.Tech., M.Tech.).

Program Outcomes (POs): Statements describing what students are expected to know and be able to do by the time they graduate, closely aligned with the Graduate Attributes.

Program Educational Objectives (PEOs): Statements that describe the expected accomplishments of graduates in their professional careers, particularly within the first few years after graduation.

Program Specific Outcomes (PSOs): Statements describing what students should be able to perform at the time of graduation with respect to a specific discipline. A program typically defines two to three PSOs.

Graduate Attributes (GA): The qualities and competencies expected from a graduate of a program.

Guidelines for Implementing Outcome-Based Education

- Develop a clear vision and mission for OBE, with a shared understanding of the desired educational outcomes and the role OBE plays in achieving them.
- Involve all stakeholders – educators, administrators, students, industry representatives, and the wider community – in the process.
- Assess current practices and programs to identify areas where curricula need revision and to ensure necessary resources and support systems are available.

- Design outcome-based curricula and assessment methods that enable effective measurement of student learning outcomes.
- Provide professional development for educators so they can effectively deliver outcome-based curricula and assessment strategies.
- Utilize technology for online learning and outcomes assessment to enhance efficiency, effectiveness, and accessibility.
- Continuously evaluate and refine the OBE process to keep it relevant and effective.

Tools and Resources for an Effective OBE Process

Learning Management Systems (LMS): Digital platforms used to deliver course materials, assessments, and other educational resources, and to provide real-time feedback on learning progress.

Outcomes Assessment Tools: Tools that help measure student learning outcomes through examinations, portfolios, projects, and simulations.

Rubrics: Structured scoring tools that provide a consistent method for evaluating student work and ensuring assessments align with intended outcomes.

Collaborative Learning Platforms: Platforms that allow students to work together, share ideas, and receive feedback — supporting teamwork, communication, and critical thinking.

Professional Development Resources: Training materials, webinars, workshops, and online courses that equip educators to implement OBE effectively.

3. OBE Framework

The adoption of the OBE framework at Sharnbasva University flows from the University's Vision and Mission through to Program Educational Objectives, Program/Program-Specific Outcomes, curriculum and Course Outcomes, teaching-learning and assessment, and finally attainment evaluation that feeds back into continuous quality improvement, as illustrated in Figure 1.

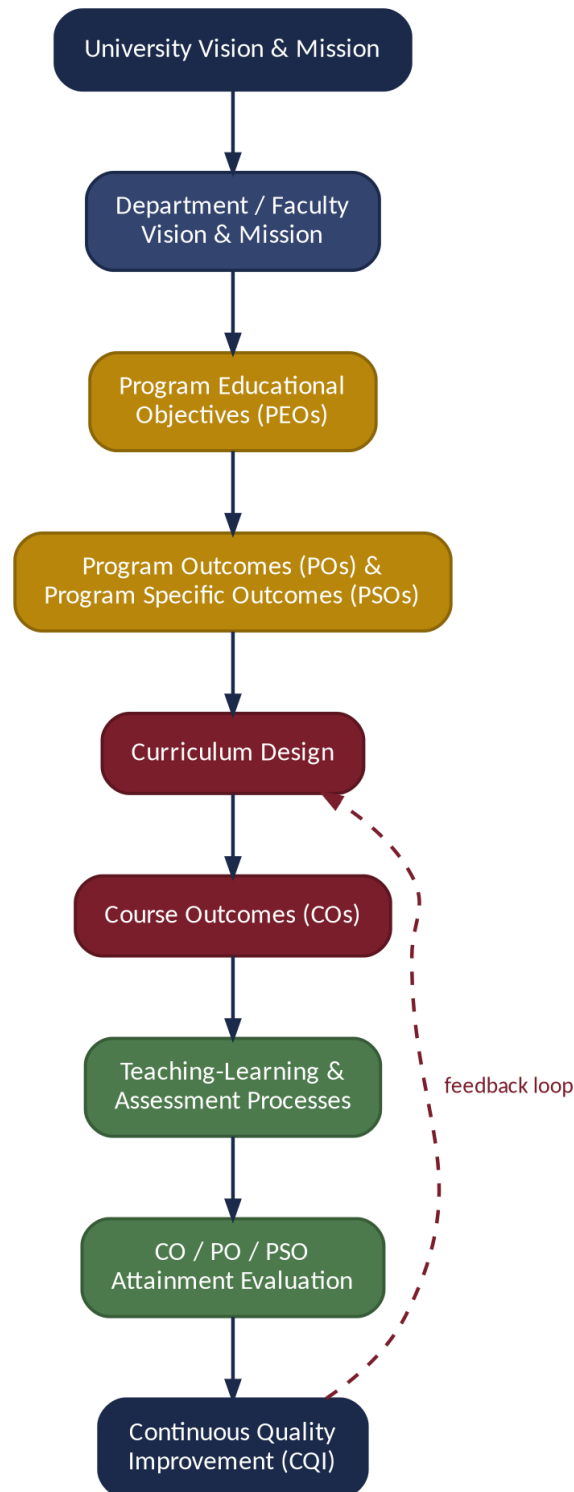


Figure 1: OBE Framework of Sharnbasva University

3a. Establishing PEOs Using Vision and Mission Statements

Program Educational Objectives (PEOs)

Program Educational Objectives (PEOs) aim to develop critical thinking, analytical ability, innovation, creativity, and problem-solving skills among graduates. The program prepares graduates to be employable across various sectors. Furthermore, by pursuing higher education and advanced degrees, graduates can build careers in academia or scientific organizations as researchers.

Process for Defining the Vision and Mission of the Department/Faculty

The Department/Faculty Vision and Mission statements are defined consistent with the Vision and Mission statements of the University. The basis for defining these statements is feedback collected from all stakeholders who have a stake in the future of the Department and the Institute. The process for finalizing the Vision and Mission statements of the Department/Faculty is described below and illustrated in Figure 2.

Step 1: Feedback is collected from internal stakeholders (students, teaching faculty, and support staff) and external stakeholders (alumni, parents, industry experts, and professional body members). The expectations of regulating agencies – including AICTE, UGC, NBA, and NAAC – are also considered.

Step 2: Feedback collected from all stakeholders is discussed in a series of faculty meetings, resulting in alternative sets of Vision and Mission statements for the Department.

Step 3: The selected set of statements is discussed at a Program Assessment Committee (PAC) meeting, and draft Vision and Mission statements are prepared.

Step 4: The draft Vision and Mission statements are reviewed and finalized by the Department Advisory Board (DAB) / Board of Studies (BoS).

Step 5: The finalized statements are submitted to the Academic Council and Board of Governors for ratification. The ratified Vision and Mission statements of the Department are published and disseminated through appropriate means to internal and external stakeholders.

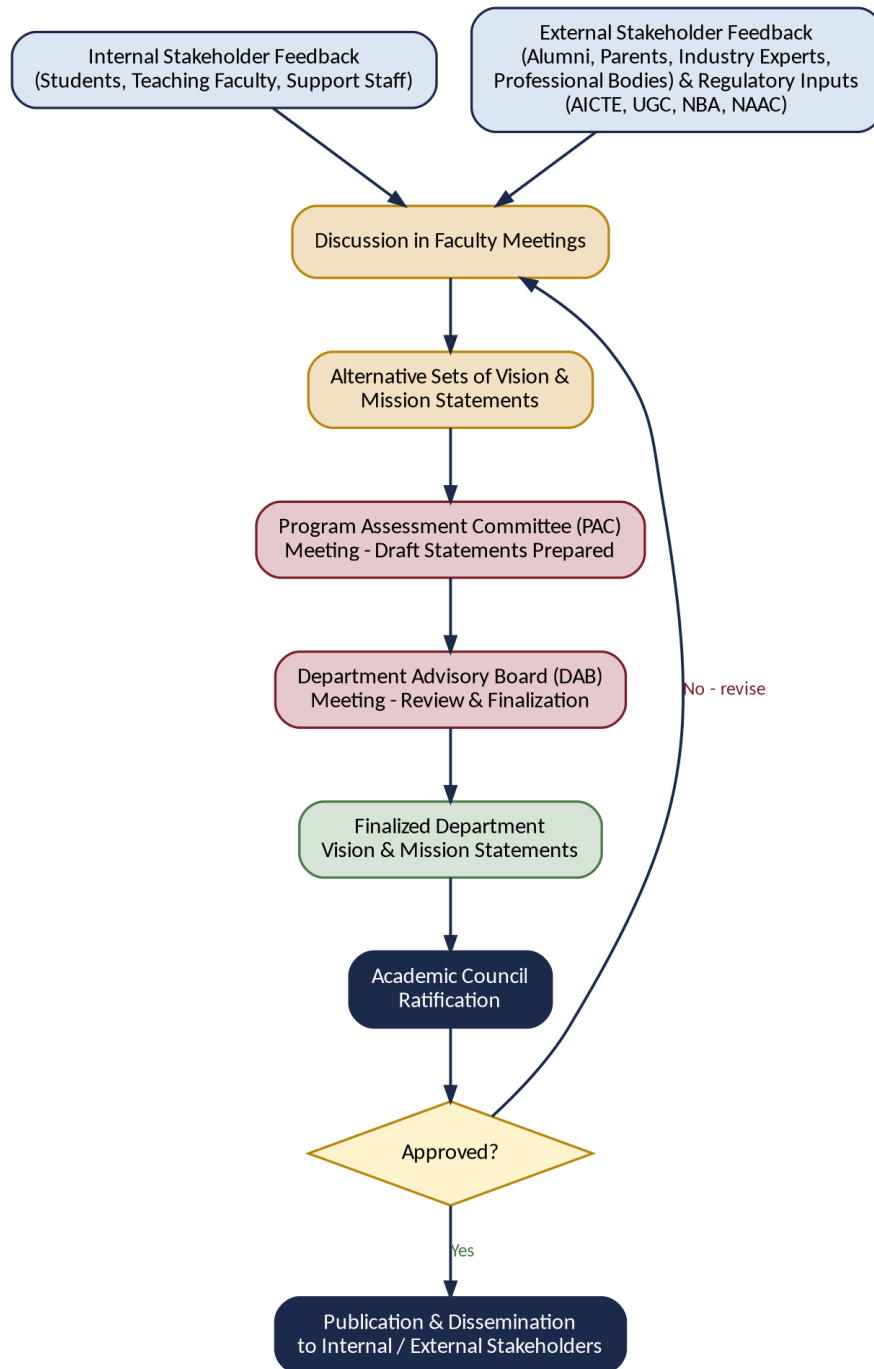


Figure 2: Process of Defining the Vision and Mission of the Department

Program Assessment Committee (PAC) and Board of Studies (BoS)

The Program Assessment Committee (PAC) consists of the following members:

- Dean of the Faculty / Chairperson of the Department – Chairperson
- Program Chair (PC) – Program Coordinator
- Professors, Associate Professors, and Assistant Professors of the faculty associated with the program

The Board of Studies (BoS) functions as the governing body of the program and consists of:

- The Board of Studies shall consider a report on any matter or an issue referred to it by the Academic Council or the Faculty or the Dean of the concerned faculty.

- The Board of Studies of a subject or a Group of Subjects shall recommend to the Academic Council through the concerned faculty, the courses of study, detailed curriculum and scheme of examinations of each course for different levels of studies in such subject(s)/discipline(s).

Process of Defining PEOs of the Program

PEOs are defined to help realize the Mission of the Department through the effective design and implementation of the Program. They reflect the aspirations of engineering/professional graduates, consistent with the demands of industry and the needs of society. The systematic steps followed for defining PEOs, so that they remain in line with the Department Vision and Mission, are illustrated in Figure 3.

Step 1: Feedback is collected from internal stakeholders (teaching faculty and support staff) and external stakeholders (alumni, industry experts, and professional body members). Expectations of regulating agencies (AICTE, UGC, NBA, NAAC) are also considered, together with the Program Outcomes and the Vision and Mission of the University and Department, which serve as the basic guide for consultation.

Step 2: Feedback collected from all stakeholders is discussed in a series of faculty meetings, resulting in alternative sets of PEO statements. The PAC collates the inputs and prepares draft/revised PEO statements, which are circulated to all stakeholders for suggestions and inputs.

Step 3: The selected set of statements is discussed at a Program Assessment Committee (PAC) meeting, and draft PEO statements of the Department are prepared.

Step 4: The draft PEO statements are reviewed and finalized by the Department Advisory Board (DAB) / Board of Studies (BoS).

Step 5: The Director/Program Coordinator presents the finalized PEOs to the Board of Studies and submits the final version to the Academic Council and Board of Governors for approval. On approval, the PEOs are published and disseminated to all internal and external stakeholders; if not approved, the feedback is routed back for further discussion.

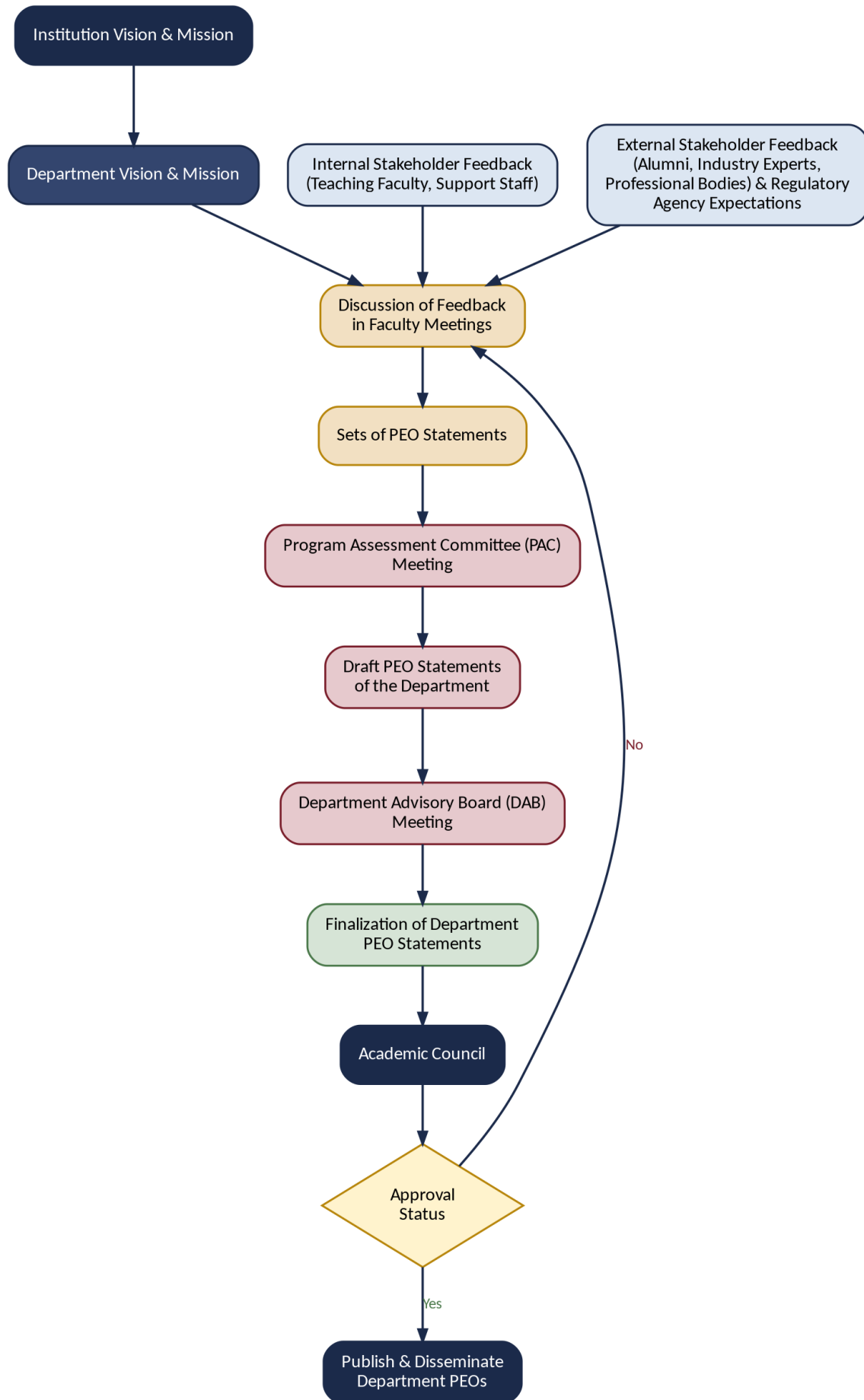


Figure 3: Process of Defining the PEOs of the Program

3b. Bloom's Taxonomy and Action Verbs for Course Outcomes

Bloom's Taxonomy was developed to provide a common framework for educators to discuss and exchange learning and assessment methods. Although specific learning outcomes can be derived from the taxonomy, it is most commonly used as a tool for assessing learning across a range of cognitive levels. The goal of using Bloom's Taxonomy is to encourage higher-order thinking in students by building upon lower-level cognitive skills. Table 1 defines each cognitive level, from lower-order to higher-order thinking, and the key phrases that can be used to elicit these skills during assessment.

In Bloom's Taxonomy, cognitive levels are mapped to knowledge levels (K1, K2, ..., K6), which are further classified into two cognitive process dimensions – Low Order Thinking (LOT) and High Order Thinking (HOT). Students are assessed on fundamental concepts within LOT and on advanced learning within HOT; this classification aids in defining course outcomes at an appropriate level.

Table 1: Bloom's Cognitive Levels (Low to High Order Thinking)

Order	Cognitive Level	Description
LOT	Remember (K1)	Recall facts, terms, and basic concepts.
LOT	Understand (K2)	Explain ideas or concepts in one's own words.
LOT	Apply (K3)	Use information in new, concrete situations.
HOT	Analyze (K4)	Break information into parts to explore relationships and patterns.
HOT	Evaluate (K5)	Justify a decision or course of action based on criteria and standards.
HOT	Create (K6)	Generate new ideas, products, or ways of viewing things by combining elements.

Table 2: The Knowledge Dimension

The knowledge dimension refers to the mapping of abstract knowledge to concrete knowledge, spanning four categories: factual, conceptual, procedural, and metacognitive.

Factual	Conceptual	Procedural	Metacognitive
Knowledge of terminology; knowledge of	Knowledge of classifications and categories; knowledge of principles and	Knowledge of subject-specific skills and algorithms; knowledge of subject-	Strategic knowledge; knowledge about cognitive tasks, including

specific details and elements	generalizations; knowledge of theories, models and structures	specific techniques and methods; knowledge of criteria for determining when to use appropriate procedures	appropriate contextual and conditional knowledge; self-knowledge
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Table 3: Representative Action Verbs by Cognitive Level

Each knowledge level is associated with a set of action verbs (“Bloom action verbs”) used to frame Course Outcomes (COs) and Course Objectives at the appropriate cognitive level.

Remember	Understand	Apply	Analyze	Evaluate	Create
• Choose	• Classify	• Apply	• Analyze	• Agree	• Adapt
• Define	• Compare	• Build	• Assume	• Appraise	• Build
• Find	• Contrast	• Choose	• Categorize	• Assess	• Change
• How	• Demonstrate	• Construct	• Classify	• Award	• Choose
• Label	• Explain	• Develop	• Compare	• Choose	• Combine
• List	• Extend	• Experiment with	• Conclusion	• Compare	• Compile
• Match	• Illustrate	• Identify	• Contrast	• Conclude	• Compose
• Name	• Infer	• Interview	• Discover	• Criteria	• Construct
• Omit	• Interpret	• Make use of	• Dissect	• Criticize	• Create
• Recall	• Outline	• Model	• Distinguish	• Decide	• Delete
• Relate	• Relate	• Organize	• Divide	• Deduct	• Design
• Select	• Rephrase	• Plan	• Examine	• Defend	• Develop
• Show	• Show	• Select	• Function	• Determine	• Discuss
• Spell	• Summarize	• Solve	• Inference	• Dispose	• Elaborate
• Tell	• Translate	• Utilize	• Inspect	• Estimate	• Estimate
• What			• List	• Evaluate	• Happen
• When			• Motive	• Explain	• Imagine
• Where			• Relationships	• Importance	• Improve
• Which			• Simplify	• Interpret	• Invent
• Who			• Survey	• Judge	• Make up
• Why			• Take part in	• Justify	• Maximize
			• Test for	• Mark	• Minimize
			• Theme	• Measure	• Modify

				• Opinion	• Original
				• Perceive	• Originate
				• Prioritize	• Plan
				• Prove	• Predict
				• Rate	• Propose
				• Recommend	• Solution
				• Rule on	• Solve
				• Select	• Suppose
				• Support	• Test
				• Value	• Theory

Table 3 presents a representative action verbs list.

c. POs, PSOs and COs

Program Outcomes (POs)

- Program Outcomes (POs) are statements that describe what students are expected to know and be able to do upon completion of a program.
- POs relate to the skills, knowledge, analytical abilities, attitudes, and behaviours that students are expected to acquire through the program.
- These parameters are referred to as Graduate Attributes (GAs) and may vary across disciplines and academic levels.
- POs indicate the level of competency students are expected to attain based on the subject-specific knowledge and skills acquired during the program.

Program Specific Outcomes (PSOs)

- PSOs describe what students are expected to be able to do at the time of graduation in relation to a specific program or discipline.
- PSOs shall be program-specific and shall be formulated by the department/faculty offering the program.
- Normally, each program shall have two to three PSOs.
- PSOs shall be finalized by the department/faculty in consultation with the Director, Program Coordinators, and subject experts, and shall be approved by the competent authority.

Course Outcomes (COs)

- COs are narrower statements that describe what students are expected to know and be able to do at the end of a course.
- While POs define program-level outcomes, COs are course-specific and focus on the knowledge, skills, and competencies to be attained through an individual course.
- COs shall be formulated by the course faculty in consultation with the concerned academic authorities.
- COs shall collectively contribute to the attainment of Program Outcomes (POs) and Program Specific Outcomes (PSOs).

- A CO may be mapped to one or more POs/PSOs, and multiple COs may contribute to the attainment of a single PO/PSO, depending on the extent of alignment and contribution.

3d. Design of Curriculum

- All programs shall include Program Outcomes (POs), Program Specific Outcomes (PSOs), Course Objectives, and Course Outcomes (COs).
- The POs, PSOs, and COs of all programs and courses shall be prepared in alignment with the Vision and Mission of the University and the learning requirements of students.
- Course Outcomes shall be mapped to the relevant Program Outcomes and Program Specific Outcomes.
- Course Outcomes shall also be aligned with the appropriate Bloom's Taxonomy learning levels.
- Course delivery and assessment methods shall be designed to facilitate the attainment of the stated Course Outcomes.
- The Course Outcomes for each course shall be finalized through discussion and consultation among all faculty members handling the course, with the approval of the concerned academic authority.

Process for Designing the Program Curriculum

The design and development of the program curriculum at Sharnbasva University is a structured, collaborative, and outcome-based process, conducted in line with the regulatory frameworks of UGC, AICTE, and the internal academic policies of the University. The curriculum encompasses a balanced blend of Basic Sciences, Humanities, Engineering Sciences, Professional Core, Professional Electives, Open Electives, Mandatory Courses, Project Work, and Internships, as recommended by AICTE. The curriculum is reviewed and revised periodically to ensure relevance, quality, and alignment with advancements in education, industry expectations, and societal needs, following both consultative and deliberative approaches involving multiple academic bodies and stakeholders. The process, illustrated in Figure 4, comprises the following steps:

Step 1 – Formulation of PSOs: Each department initiates the curriculum design by formulating Program Specific Outcomes (PSOs) based on the Institute's Vision and Mission, and in compliance with AICTE and SUK guidelines.

Step 2 – Stakeholder Consultation: Curriculum feedback is collected from various stakeholders, including faculty, students, alumni, employers, and parents. The Chairperson, in consultation with faculty members, drafts the curriculum outline by referring to model curricula from statutory bodies (AICTE, UGC) and benchmarking with premier institutions such as the IITs and IISc.

Step 3 – Course Selection and Structuring: Courses are identified and structured under respective program categories, ensuring alignment with Program Outcomes (POs) and PSOs.

Step 4 – Design of Course Outcomes (COs): For every course, Course Outcomes are developed based on the revised Bloom's Taxonomy, addressing different cognitive levels of learning.

Step 5 – Mapping COs with POs and PSOs: Each CO is meticulously mapped to relevant POs and PSOs, forming an integral part of the course syllabus and curriculum structure.

Step 6 – Internal Review: The draft curriculum and syllabi are scrutinized by the Department Advisory Committee and Program Assessment Committee to verify compliance with institutional and statutory guidelines; the draft is refined iteratively until ready.

Step 7 – Board of Studies (BoS) Review: The reviewed draft is presented to the Board of Studies, comprising internal faculty, industry experts, and external academicians. The BoS meeting is held at least once a year.

Step 8 – Incorporation of BoS Feedback: Suggestions and feedback from BoS members are considered and incorporated to further refine the curriculum and ensure academic rigour and relevance.

Step 9 – Academic Council Approval: The revised curriculum is forwarded to the Academic Council for final approval, following the University's academic governance procedures.

Step 10 – Dissemination and Implementation: Upon approval, the curriculum and syllabi are formally published on the website and disseminated to the Registrar's office, faculty members, and students, and implemented from the respective academic session.

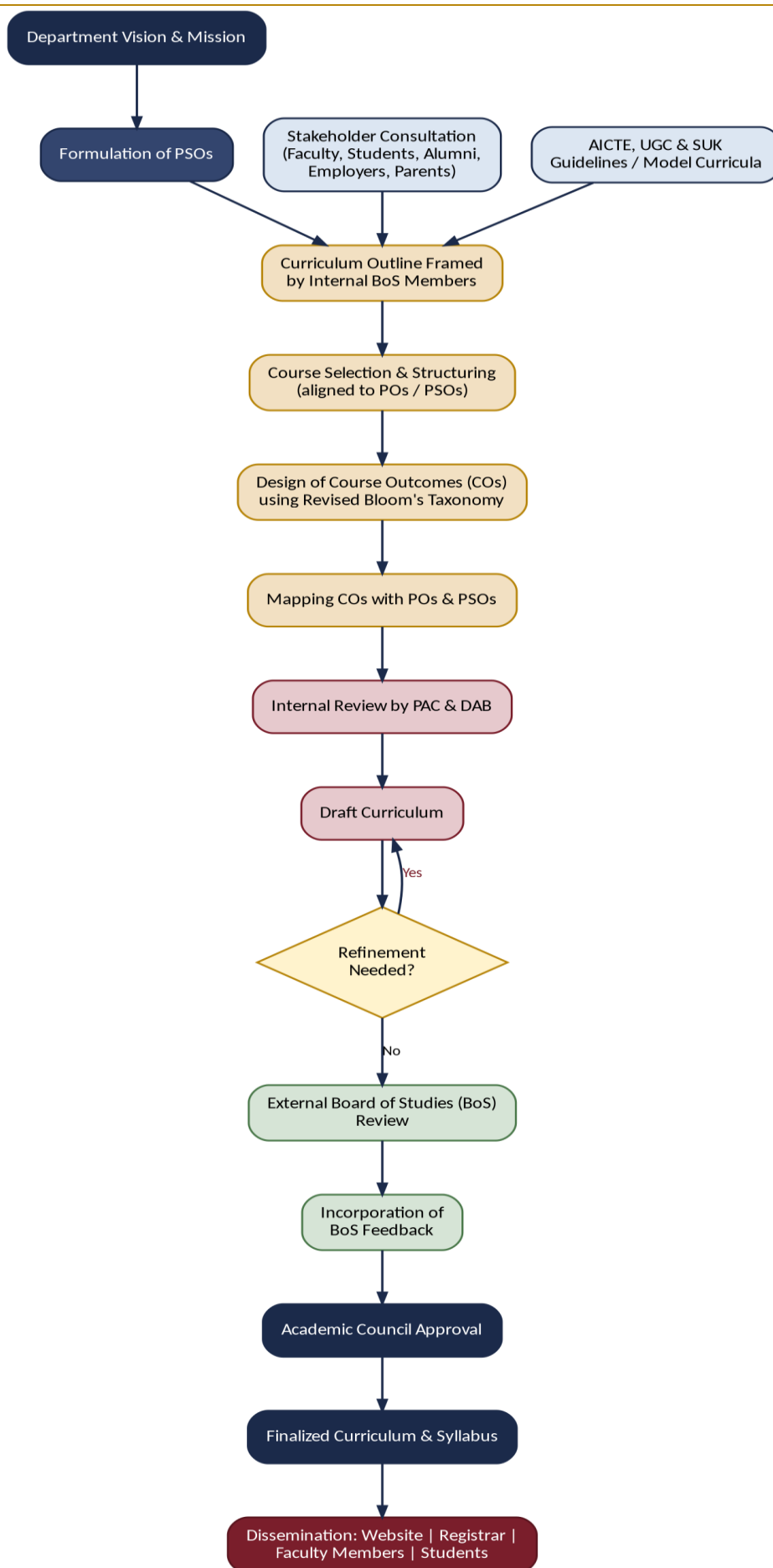


Figure 4: Process for Designing the Program Curriculum

Guidelines for Writing Course Outcome Statements

A well-written Course Outcome (CO) should comprise three essential components: an appropriate Action Verb aligned with the Revised Bloom's Taxonomy (RBT), the specific Subject Content to be addressed, and the Context defining the condition or level of performance expected from the learner.

Example

#	Action Verb	Content	Context
1	Develop	writing skills	effectively
2	Analyze	electrical circuits	using nodal and mesh analysis
3	Apply	the common engineering design process	to solve complex problems
4	Make use of	vector integral theorems	to evaluate area, surface area and volumes
5	Build	functions	to increase code reusability

Note: Where a laboratory is offered as a separate course with its own course code, separate Course Outcomes shall be defined for the laboratory component.

3e. CO-PO Mapping

CO-PO (Course Outcome–Program Outcome) mapping is carried out to establish the relationship between the Course Outcomes of a course and the Program Outcomes of the program. The purpose of CO-PO mapping is to ensure that each course contributes appropriately to the attainment of the Program Outcomes, and that students progressively develop the knowledge, skills, competencies, and professional attributes envisaged in the program. CO-PO mapping is also used to assess the extent of attainment of Program Outcomes through the courses offered and to identify areas requiring corrective action. The process supports continuous review and enhancement of curriculum design, teaching-learning practices, and assessment methods.

Process of Course Outcome–Program Outcome Mapping

Map Course Outcomes to Program Outcomes: Each CO is examined against every PO/PSO and assigned a correlation level based on the extent to which the CO addresses the knowledge, skill, or attitude described by that PO/PSO.

Assign Weights: A correlation level of 1 (Low), 2 (Medium), or 3 (High) is assigned to each CO-PO/PSO pair, based on defined mapping criteria; a dash (–) indicates no mapping.

Choose Assessment Methods: Appropriate direct assessment tools (class tests, assignments, semester-end examinations, laboratory records, projects) and indirect tools (course-end surveys) are selected to measure each mapped CO.

Analyse Results: Student performance data against each CO is analysed to compute CO attainment, which is then rolled up to PO/PSO attainment using the assigned correlation weights.

Continuously Evaluate: Attainment results are reviewed each semester by the course faculty and Program Coordinator, and corrective actions are planned for COs/POs found to be under-attained.

This process ensures that course delivery remains aligned with the program outcomes and that students progressively develop the desired skills and competencies as envisaged in the program objectives.

Criteria for CO-PO Mapping Justification

(i) Criteria applicable for PO1 to PO4 and PSOs:

Level	Keywords Used in Writing COs
No mapping (-)	Keywords related to LOT and not related to the course or any outcome.
Low (1)	Part of the PO is reflected through the keywords/action verbs used.
Medium (2)	A major part of the PO is reflected through the keywords/action verbs, and moderate-level performance is expected from students to achieve the PO.
High (3)	The exact action verb of the PO is used, and critical performance is expected from students to achieve the PO.

(ii) Critical assessment record for PO5 to PO12:

Level	Assessment Depth
No mapping (-)	No rubric used for assessment.
Low (1)	A single rubric category is used for assessment.
Medium (2)	Two rubric categories are used for assessment.
High (3)	Three or more rubric categories are used for assessment.

Sample Articulation Matrix (Illustrative)

A sample CO-PO/PSO articulation matrix, as incorporated in the course handbook, is shown below:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	-	-	-	-	-	-	3	3	3

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PSO 1	PSO 2	PSO 3
CO 2	3	3	3	3	2	-	-	-	-	-	-	3	-	3
CO 3	3	3	3	3	2	-	-	-	-	-	-	3	-	3
CO 4	3	3	3	2	2	-	-	-	-	-	-	3	3	3

3f. CO-PO Attainment

The CO-PO attainment process is carried out to ensure systematic measurement of student performance and evaluation of the extent to which Course Outcomes (COs), Program Outcomes (POs), and Program Specific Outcomes (PSOs) are attained. The following steps are followed:

1. Define Program Educational Objectives (PEOs): PEOs describe the expected professional achievements of graduates within the first three to five years after graduation, formulated in consultation with relevant stakeholders.

2. Identify Graduate Attributes (GAs): GAs are identified as individually assessable outcomes that indicate the potential of graduates to acquire the competencies required for the program.

3. Develop POs and PSOs: POs and PSOs are formulated in alignment with the identified Graduate Attributes and the specific requirements of the program.

4. Develop Course Outcomes (COs): COs are defined for each course to specify the measurable knowledge, skills, and abilities expected to be attained by students upon successful completion of the course.

5. Fix Target Levels for CO Attainment: Target levels for CO attainment are established to assess student performance against the expected level of achievement, serving as a basis for continuous improvement.

6. Fix Target Levels for PO and PSO Attainment: Target levels for PO/PSO attainment are established to assess the extent to which graduates achieve the intended program outcomes and program-specific competencies.

7. Assess CO Attainment: CO attainment is measured using defined performance evaluation criteria, providing measurable evidence for the attainment of POs and PSOs.

8. Compute Course Attainment: Course Attainment combines Direct Attainment (based on student performance in prescribed assessment tools) and Indirect Attainment (based on feedback from the Course Exit Survey), in the prescribed weightage approved by the University.

Assessment Tools for Direct and Indirect Attainment

Theory Courses	Laboratory Courses	Project Work
Internal Assessment	Continuous monitoring in regular lab sessions	- Mini Project – CIE - Mini Project – SEE

• Assignments and Seminars • Semester End Examination	• Internal Lab Examination • Lab Semester End Examination	• Major Project – CIE • Major Project – SEE
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Indirect Attainment is derived through the Course Exit Survey (CES), which captures students' self-assessment of the extent to which each Course Outcome was achieved.

Process for Computing Course Attainment

Course Attainment for each Course Outcome (CO) is computed by combining Direct Attainment (DA), derived from Continuous Internal Assessment (CIE) and Semester End Examination (SEE) performance, with Indirect Attainment (IA), derived from the Course Exit Survey (CES), as illustrated in Figure 5.

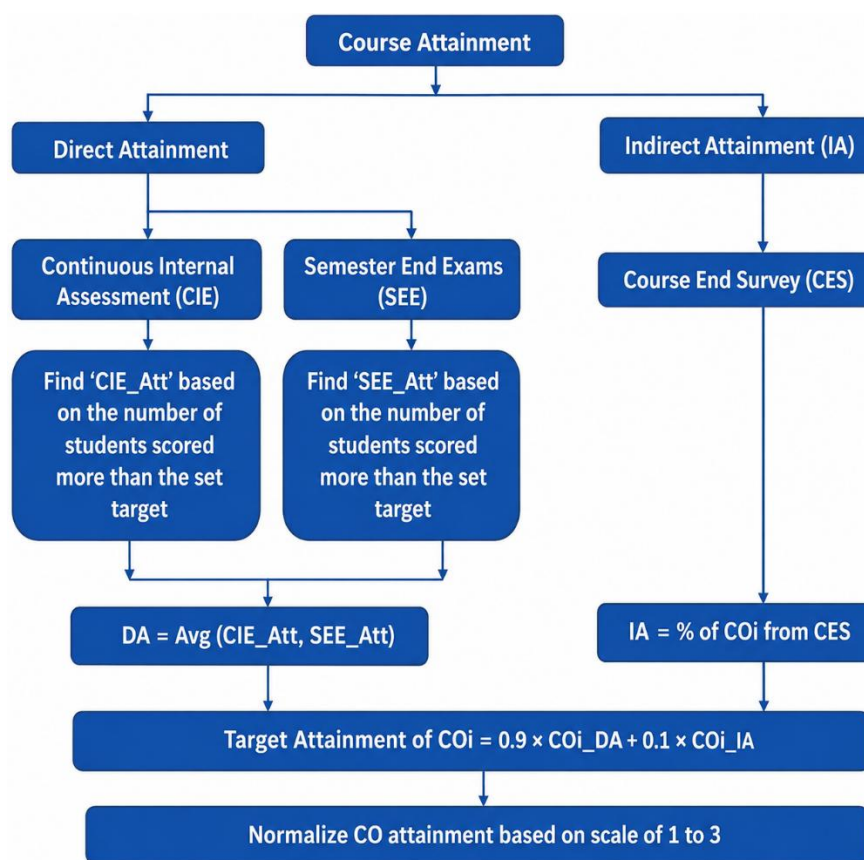


Figure 5: Process for Computing Course Attainment

CO-PO/PSO attainment for a course is computed using the procedure below:

- Direct Attainment, $DA = \text{Average}(\text{CIE_Attainment}, \text{SEE_Attainment})$, where each is based on the proportion of students scoring above the set target.
- Indirect Attainment, $IA = \text{Percentage of CO}_i \text{ attainment derived from the Course Exit Survey}$.
- Target Attainment of $\text{CO}_i = 0.9 \times \text{CO}_{i_DA} + 0.1 \times \text{CO}_{i_IA}$ (weightage as approved by the University).
- The computed CO attainment is normalized on a scale of 1 to 3 and rolled up to PO/PSO attainment using the CO-PO/PSO correlation matrix.

4. Measures for Continuous Improvement

Process to Ensure Compliance and Attainment of POs & PSOs

Continuous improvement is driven at two levels: (a) the contribution of CO attainment to PO attainment and improvement at the faculty level, and (b) PO attainment review and improvement at the Program Coordinator and Director level.

Category	Outcome	Action Taken
Course related	PO attained highly	Include activities with Higher Order Thinking (HOT) skills to further stretch student performance.
Course related	PO not attained highly	Identify the concerned courses, plan for immediate improvements, guide, support, and monitor execution.
Activity related	Activities conducted	Conduct critical assessment and impact analysis, and revise activities as needed for improvement.

All Program Outcomes (POs) are addressed through the core courses and their defined Course Outcomes (COs). When assessments are aligned with the COs, student performance reflects the level of CO attainment. This attainment data helps measure learning quality and supports continuous improvement. Attainment at the Course, Program, and Institutional levels ensures quality assurance for all stakeholders, and the analysis of attainment is used to improve course delivery, assessment practices, and curriculum design.

5. Best Practices for Evaluating PEOs and POs

Evaluating Program Educational Objectives (PEOs) and Program Outcomes (POs) is an essential aspect of Outcome-Based Education. The evaluation process provides valuable insight into the effectiveness of the program and helps identify areas for improvement. The following best practices are recommended:

Align Evaluation with PEOs and POs: The evaluation process should be aligned with the defined PEOs and POs, using a variety of assessment methods such as examinations, projects, assignments, and simulations.

Use Multiple Assessment Methods: A combination of examinations, portfolios, projects, presentations, and simulations provides a more complete evaluation of student learning outcomes.

Engage Stakeholders: Engaging faculty, administrators, students, alumni, and employers provides valuable insight into program effectiveness, through surveys, focus group discussions, feedback sessions, and review meetings.

Conduct Regular Evaluations: Evaluations should be conducted annually or periodically, as required, to assess student learning outcomes and overall program effectiveness.

Use Results for Continuous Improvement: Evaluation results should inform curriculum revision, improved assessment strategies, and adoption of effective teaching-learning practices.

6. Course Outcomes – Benefits and Strategies

Benefits of Clearly Defined Course Outcomes

Improved Student Learning: Clearly defined outcomes help students understand what they are expected to learn, allowing them to focus their efforts and improve learning outcomes.

Increased Student Motivation: When students clearly understand what they are working toward, they are more likely to be motivated to engage with the course content.

Better Course Design: Developing clear COs requires careful consideration of what students need to learn, contributing to better course design overall.

Improved Assessment: Clearly defined and measurable COs make it easier for instructors to assess student learning and determine achievement of desired outcomes.

Increased Accountability: Clearly stated COs keep both students and faculty accountable for achieving the intended learning goals.

Strategies for Writing and Measuring Effective Course Outcomes

Start with the End in Mind: Identify the broader goals of the course and determine what students should know and be able to do by the end of it.

Write Measurable Outcomes: COs should be specific, measurable, and achievable. Avoid vague terms such as “understand”; use action verbs such as “analyse,” “evaluate,” “design,” “apply,” or “synthesize.”

Align Outcomes with Assessment Methods: Consider how the attainment of each outcome will be measured, using examinations, assignments, essays, projects, presentations, or practical work as appropriate.

Use a Variety of Assessment Methods: A combination of objective tests, essays, case studies, and projects provides a more comprehensive view of student learning.

Assess Student Learning Regularly: Regular assessment helps students stay on track and provides opportunities for timely intervention and improvement.

Provide Feedback to Students: Feedback should be timely, specific, and meaningful, helping students understand their strengths and areas for improvement.

Reflect and Revise: At the end of each course, faculty should review the COs and assessment methods used, identify areas for improvement, and revise accordingly.