

A M Patel Institute Of Computer Studies



OUTCOME-BASED EDUCATION (OBE) MANUAL

Master Of Computer Applications



A M Patel Institute of Computer Studies

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Abstract

The MCA Program of A. M. Patel Institute of Computer Studies (AMPICS), Ganpat University, follows an Outcome-Based Education (OBE) philosophy that places student learning, measurable competencies, professional readiness, ethical responsibility and continuous improvement at the centre of academic planning and delivery.

The department adopts a systematic approach in which the institutional Vision and Mission guide the Program Educational Objectives (PEOs), Program Outcomes (POs) and Course Outcomes (COs). The curriculum, teaching-learning activities, assessment methods and academic improvement initiatives are aligned with these outcomes to ensure that students develop the knowledge, skills and professional attributes expected of MCA graduates.

The program promotes conceptual understanding, computational thinking, problem analysis, software design and development, modern computing-tool usage, teamwork, project management, ethical professional practice and lifelong learning. Students are provided opportunities to demonstrate their learning through classroom instruction, laboratory exercises, programming assignments, case studies, practical examinations, mini-projects, full-time projects, presentations and industry-oriented learning activities.

Course Outcomes are formulated using measurable action verbs aligned with appropriate cognitive levels of Bloom's Taxonomy. Each CO is aligned with relevant POs through a justified CO-PO mapping matrix. Teaching-learning activities and assessment tools are selected to provide observable evidence of student achievement against these outcomes.

The department measures CO attainment using approved direct assessment methods, including internal assessments, semester-end examinations, laboratory work, assignments and project evaluations. Indirect assessment methods, including course-end and graduate/exit surveys, provide supplementary feedback.

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CO attainment contributes to PO attainment through the approved mapping and calculation methodology.

The department follows an evidence-based continuous-improvement cycle. Attainment results, stakeholder feedback, academic reviews and student-performance trends are analysed to identify strengths and learning gaps. Appropriate corrective and enhancement measures are planned, approved, implemented and evaluated in subsequent academic cycles.

Through this integrated OBE framework, AMPICS aims to develop MCA graduates who can apply computing knowledge to solve real-world problems, design and develop effective technological solutions, adapt to emerging technologies, work collaboratively, manage projects responsibly and contribute ethically to industry and society.

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1. Purpose, Scope and OBE Principles

Outcome-Based Education (OBE) is a student-centered approach in which course delivery, learning activities and assessment are planned around clearly stated learning outcomes. The purpose is to identify what students should know and be able to demonstrate, measure their achievement, analyse gaps and use the results to improve teaching and learning. This manual describes the OBE process for the MCA program at A M Patel Institute of Computer Studies (AMPICS).

1.1 Objectives

- Align program and course outcomes with the institute vision and mission and the intended graduate capabilities.
- Use measurable Course Outcomes (COs), Program Outcomes (POs) and Program Educational Objectives (PEOs) to guide curriculum planning and assessment.
- Use suitable direct and indirect assessment evidence to evaluate learning outcomes.
- Maintain documented CO–PO mapping, attainment calculations, feedback analysis and action taken.
- Use evidence-based review to support continuous improvement.

1.2 Scope and application

The framework applies to the MCA program's curriculum planning, course delivery, theory and practical assessment, projects, semester-end assessment, course-end and graduate/exit surveys, program outcome review, and continuous-improvement activities. Specific processes remain subject to the applicable university regulations, approved syllabus, examination rules and decisions of competent academic bodies.

1.3 Key terms

Term	Meaning in the OBE process
Course	A theory, practical or theory-cum-practical subject studied during a semester.

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Course Outcome (CO)	A measurable statement of what a learner should be able to demonstrate at the end of a course.
Program Outcome (PO)	A statement describing what students are expected to know and be able to do by graduation.
Program Specific Outcome (PSO)	A discipline-specific capability expected of graduates.
Program Educational Objective (PEO)	An expected graduate achievement in the first few years after graduation.
Direct assessment	Assessment based on student performance evidence, such as internal assessments, university examinations, practical work and projects.
Indirect assessment	Feedback-based evidence, including course-end and graduate/exit surveys.
Attainment	A calculated or rubric-based indication of the extent to which an outcome target has been achieved.

2. Institutional Vision, Mission and Quality Orientation

2.1 Institute Vision

“To be a leading institution in Computer Applications and Information Technology, nurturing innovation, research, and technical excellence to meet emerging societal and industrial needs.”

2.2 Institute Mission

“To drive excellence in Computer Applications and Information Technology through quality education, innovative research, and industry partnerships, cultivating ethical leaders ready to address industry and societal challenges.”

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2.3 Quality orientation

The program's OBE processes are intended to support quality education, innovation and research, industry engagement, ethical professional practice, and responsiveness to societal and industrial needs. These priorities are reflected in the institute vision and mission and in the MCA PEOs.

2.4 Dissemination and stakeholder awareness

The use of digital and physical channels to publish and communicate the Vision, Mission and PEOs.

Channel type	Examples
Digital	Institute website (https://ampics.guni.ac.in/about/vision-and-mission); institute digital display boards; program/course handbooks; course files and laboratory manuals; orientation/induction programs; alumni association website.
Physical	Executive Dean Office, Dean/Principal office; HOD office; staff rooms; notice boards; classrooms; laboratories.
Stakeholder engagement	Student orientation, faculty communication, Institute Academic Board interactions, management/statutory meetings, parent orientation, industry/employer interactions, alumni interactions/surveys and professional-body events.

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Operational expectation: the program should retain current copies/screenshots, meeting records, orientation materials and other evidence that demonstrate dissemination and awareness.

3. OBE Framework and Responsibilities

3.1 OBE cycle

Stage	Activities documented or supported by the source documents	Expected records
Before the semester	Faculty competency/domain knowledge; course preference and allotment based on competency; course-file preparation and approval; timetable preparation in line with the academic calendar.	Course allocation, approved course files, timetable and course plans.
During the semester	Monitor syllabus pace; follow the planned teaching-learning approach; conduct continuous evaluation; address slow and advanced learners.	Teaching plan, attendance, assessment records, learner-support records and progress reviews.

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End of the semester	Conduct examinations as scheduled; assess and evaluate student work; collect stakeholder survey information; compute CO/PO attainment; conduct gap analysis; prepare course-completion summary and submit improvement measures.	Assessment records, attainment sheets, survey analysis, course-completion summary and action-taken records.
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3.2 Roles and academic review

The Institute Academic Board (IAB) as participating in the development of institutional and program objectives, with stakeholder inputs from alumni, industry partners and employers. It also refers to a Faculty Committee for approval of PEOs and to academic committees involved in syllabus design, CO–PO mapping and course review.

- Course faculty: formulate course outcomes with the course team, align teaching and assessment to outcomes, map assessment questions to COs, maintain records and analyse attainment.
- Course coordinators/program coordinators: coordinate course delivery, assessment records, survey collection, mapping and consolidated attainment analysis.
- Academic/program committees: review alignment, stakeholder feedback, attainment gaps and improvement proposals under the institution’s approved governance process.
- Stakeholders: students, alumni, employers, industry partners, faculty and relevant academic experts provide feedback to inform outcome relevance and review.

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The exact authority, membership, meeting frequency and approval sequence should follow current approved institutional regulations. This manual does not create new statutory powers.

4. Program Educational Objectives (PEOs)

The MCA program aims to produce highly competent computer application professionals who can contribute to advancement of the field and meet the evolving needs of the profession. It lists the following three PEOs.

PEO	Title	Statement
PEO1	Professional Success	Apply knowledge of computer applications and Information Technology, and problem-solving skills to build efficient, scalable, and innovative solutions.
PEO2	Lifelong Learning & Innovation	Engage in continuous learning to address emerging technological challenges through research, innovation, and analytical thinking.
PEO3	Ethics & Social Responsibility	Demonstrate professionalism and ethical responsibility through industry collaboration and community engagement for sustainable and inclusive growth.

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4.1 PEO development and review process

- Use the institute Vision and Mission, relevant program outcomes and the learning/career expectations of MCA graduates as the starting reference.
- Collect inputs from relevant stakeholders, including faculty, students, alumni, employers and industry partners.
- The designated academic committee consolidates inputs and drafts or reviews the PEO statements.
- Circulate the draft for stakeholder feedback and discuss the feedback through the applicable academic review mechanism.
- Submit the revised PEOs to the competent committee/body for approval and maintain the approved version and meeting evidence.
- Communicate approved PEOs through the publication and dissemination channels identified in Section 2.4.

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4.2 Mission–PEO correlation

Aa three-point correlation scale: 1 = Slight/Low, 2 = Moderate/Medium, and 3 = Substantial/High. It contains the following mission elements and correlation values.

Mission element from SAR	PEO1	PEO2	PEO3
M1: Provide quality education and training in Computer Application with technical competency and problem-solving skills. (Quality Education)	3	2	3
M2: Encourage research and innovation in emerging areas addressing real-world complexities. (Research & Innovation)	2	3	2

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M3: Strengthen industry-academia interaction for professional growth and to instill ethical values for responsible societal contribution. (Collaboration & Service)	3	2	3
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The detailed justification should be retained with the institute's approved mission-PEO mapping record. Any change to the PEOs or mapping must be documented through the applicable review and approval process.

5. Bloom's Taxonomy and Course Outcome Writing

The supplied OBE Manual uses Bloom's Taxonomy to describe increasing cognitive complexity and recommends selecting action verbs that make outcomes observable and assessable.

Level	Cognitive process	General description	Example action verbs from the OBE Manual
1.	Remember	Recall previously learned information.	Define, identify, list, name, recall, state.
2.	Understand	Explain or interpret meaning.	Classify, compare, discuss, explain, summarise.

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3.	Apply	Use learning in a new or concrete situation.	Apply, calculate, demonstrate, implement, solve, use.
4.	Analyse	Break material or a problem into parts and examine relationships.	Analyse, compare, differentiate, examine, investigate.
5.	Evaluate	Make and justify a judgement against criteria.	Assess, evaluate, justify, recommend, validate.
6.	Create	Combine elements to produce a new solution or artefact.	Create, design, develop, formulate, generate, construct.

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5.1 SMART principles for CO statements

Principle	Practical check
Specific	Does the outcome identify a precise behavior and context?
Measurable	Can the performance be observed and assessed?
Achievable	Can students reasonably achieve it within the course?
Relevant	Does it matter to the course, program and stakeholders?
Time-bound	Is it expected by the end of the course or a clearly stated learning period?

5.2 Recommended structure

A course outcome should normally combine an action verb, the subject/content being learned, the expected level of performance and the context or mode in which the performance will be demonstrated. Course outcomes should be aligned with the approved syllabus, teaching-learning methods and assessment tasks.

The supplied OBE Manual states that where a laboratory is a separate course with its own course code, separate laboratory COs should be written.

5.3 Course outcome approval and documentation

- Prepare COs for every course using the approved course content and intended graduate capabilities.
- Use clear, assessable action verbs and avoid vague verbs that cannot be measured reliably.

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- Discuss and finalize COs with the course teachers/coordinators under the program's academic process.
- Map each assessment question/task to the relevant COs and retain the mapping in the course file.
- Review COs when the syllabus, course structure, technology or stakeholder expectations change, following the approved process.

6. Program Outcomes and Program Specific Outcomes

6.1 Eight-PO scheme

PO	Outcome statement
PO1 – Foundation Knowledge	Apply knowledge of mathematics, programming logic and coding fundamentals for solution architecture and problem solving.
PO2 – Problem Analysis	Identify, review, formulate and analyse problems for primarily focussing on customer requirements using critical thinking frameworks.
PO3 – Development of Solutions	Design, develop and investigate problems with an innovative approach for solutions incorporating ESG/SDG goals.
PO4 – Modern Tool Usage	Select, adapt and apply modern computational tools such as development of algorithms with an understanding of the limitations including human biases.

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PO5 – Individual and Teamwork	Function and communicate effectively as an individual or a team leader in diverse and multidisciplinary groups. Use methodologies such as agile.
PO6 – Project Management and Finance	Use the principles of project management such as scheduling, work breakdown structure and be conversant with the principles of Finance for profitable project management.
PO7 – Ethics	Commit to professional ethics in managing software projects with financial aspects. Learn to use new technologies for cyber security and insulate customers from malware.
PO8 – Life-long learning	Change management skills and the ability to learn, keep up with contemporary technologies and ways of working.

6.2 Older 12-PO scheme

The previous 12-PO set are as below. Its broad statements are reproduced below for traceability only. The crosswalk maps old outcomes to the revised 8-PO scheme; the crosswalk should not be treated as a one-to-one equivalence in every case.

Old PO	Statement
PO1	Apply fundamental knowledge of mathematics, computing science and domain knowledge to provide IT solutions.
PO2	Ability to learn programming, operating system, design, conduct experiments, analyze, process data and interpret results.
PO3	Design, develop and evaluate software solutions to meet societal and environmental concerns and process to meet desired needs within realistic constraints.

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PO4	Conduct investigations of complex problems using research-based knowledge and methods to provide valid conclusions.
PO5	Ability to analyze, design, verify, validate, test, implement, deploy and maintain software systems.
PO6	Ability to design systems to securely exchange information between interconnected systems and understand professional ethics, cyber regulations and responsibilities.
PO7	Involve in lifelong learning for continual development as an IT professional.
PO8	Apply and demonstrate computing and management principles to manage projects in multidisciplinary environments by involving in different roles.
PO9	Ability to identify, formulate and solve problems to optimize objectives, and comprehend and write effective reports and make quality presentations.
PO10	Understand the impact of IT solutions on socio-environmental issues and professional and ethical responsibility.
PO11	Work collaboratively as a member or leader and communicate effectively.
PO12	Identify potential business opportunities and innovate to create value for society and seize that opportunity.

7. Curriculum Design and Course Outcome Alignment

The SAR describes curriculum design as a structured process intended to align the MCA curriculum with PEOs, POs, relevant NEP-2020 directions and the learning needs of students. It records participation by senior faculty, subject experts and external/industry expertise, with review of academic coherence, CO–PO mapping and workload balance.

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7.1 Curriculum alignment principles

- Align program outcomes and course outcomes with the program's approved educational objectives and institutional direction.
- Ensure the course structure provides opportunities to develop the intended technical, analytical, professional and ethical capabilities.
- Align each CO with teaching-learning methods and assessment tasks capable of demonstrating the intended learning.
- Review curriculum effectiveness using attainment data, stakeholder feedback, academic audits and relevant industry developments.
- Document proposed curriculum changes, the rationale, the reviewing body and the action taken.

7.2 Curriculum components

Component	Share of program credits	Contact hours	Credits
Program Core	51.1%	65	47
Program Electives	17.4%	24	16
Open Electives	Not stated as a percentage	02	02*
Seminar / Project work / Internships / Industrial training / Visits	31.5%	58	29
Bridge Course	0% of program credits stated	45	00**

Note: The asterisks attached to open-elective and bridge-course credits are present in the source table; the explanatory footnotes were not reproduced here because they need to be checked against the full approved curriculum record.

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7.3 Review and approval

Curriculum design/revision should follow the institution's approved academic governance and syllabus approval process. Maintain stakeholder feedback, committee minutes, the approved syllabus, course files, CO–PO mapping and action-taken evidence as the audit trail.

8. CO–PO Mapping and Justification

8.1 Mapping process

1. Confirm the approved PO scheme applicable to the curriculum and student cohort.
2. Review the approved CO statements for each course.
3. Identify the PO or POs to which each CO makes a demonstrable contribution.
4. Assign a mapping level only where the course outcome and its assessment evidence support the relationship.
5. Document a concise justification for each non-zero mapping.
6. Review the matrix for gaps, over-mapping and consistency across courses, then approve and retain it in the course file.
7. Use the mapping matrix as an input to direct PO attainment calculations and continuous improvement.

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8.2 Mapping scale in the supplied OBE Manual

Mapping level	Meaning / justification
– (No mapping)	No meaningful relationship is established between the CO and PO.
1 – Low	Part of the PO is reflected through the CO keywords/action verbs.
2 – Medium	A major part of the PO is reflected and moderate performance is expected.
3 – High	The PO action verb is closely reflected and critical performance is expected.

8.3 Additional rubric rule for PO5–PO12

Mapping level	Assessment depth
3 – High	Three or more rubric categories are used.
2 – Medium	Two rubric categories are used.
1 – Low	One rubric category is used.
– (No mapping)	Rubric is used for assessment.

Apply this rubric-based rule only where it is part of the institution's approved mapping procedure and is applicable to the PO scheme in use.

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8.4 Matrix showing the CO-PO mapping

The CO-PO Mapping Sample articulation matrix showing the CO-PO mapping incorporated in the subject P12A3SE Software Engineering Each as follows

Course Outcomes:
1 = Slight (Low); 2 = Moderate (Medium); 3 = Substantial (High); “-” = No Correlation

Name of CO	Description
CO1	Understand the software engineering concepts and compare software process models for solving defined problems.
CO2	Apply software metrics and analyze project risks to support effective project planning and management.
CO3	Construct UML structural models using classes, attributes, operations, and relationships for a given system.
CO4	Develop advanced UML structural and behavioral diagrams to model complete system interactions and workflows.

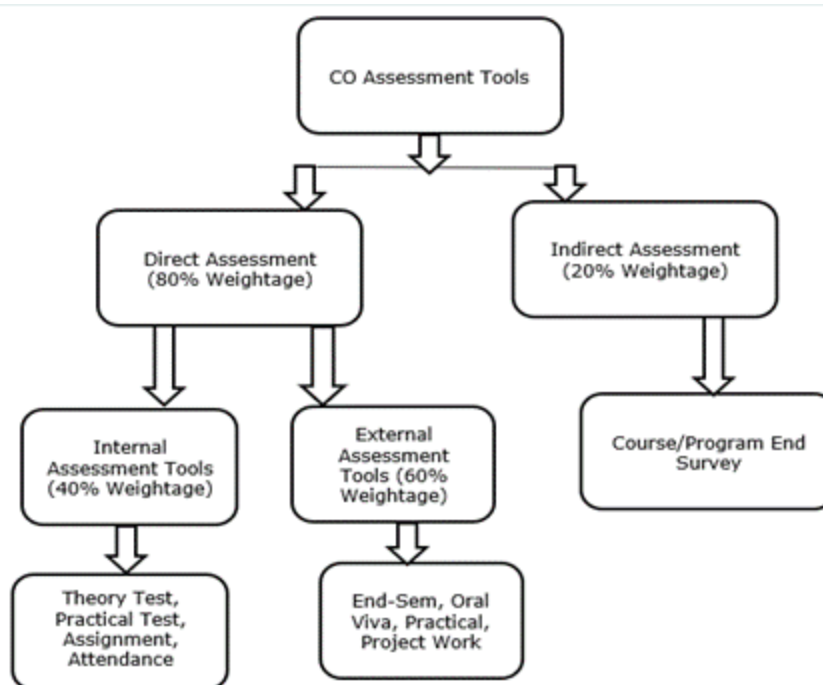
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Mapping of CO and PO								
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	2	2	1	1	1	1
CO2	2	3	2	2	1	3	1	1
CO3	2	2	3	3	1	1	1	1
CO4	1	2	3	3	1	1	1	2

9. Assessment Methods and CO Attainment

9.1 Assessment evidence

The following flowchart illustrates the detailed process of the Continuous Evaluation System and its role in achieving Course Outcomes effectively.



Course Outcome Attainment Process

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- Theory internal assessments, generally two tests conducted during the semester; the SAR describes the average/best-of-two rule as applicable to the relevant subject.
- Semester End Examination (SEE), conducted at the end of the semester.
- Assignments and quizzes.
- Attendance as a component of internal assessment, according to the documented course rules.
- Laboratory sessions and internal practical assessments, including write-up, execution and viva voce.
- Mini-project and full-time/main project assessment, including system understanding, presentation, responses to questions and project report/documentation.
- Reports, oral presentations and viva voce where relevant to the intended outcome.

9.2 Question-level computation workflow

- Map each internal and semester-end examination question to the relevant CO or COs.
- Record the maximum marks and student marks for each mapped question in the maintained assessment sheet.
- Compute student performance for each CO based on the mapped questions/tasks.
- Calculate the percentage of students meeting the defined performance target for each CO.
- Assign the CE and SEE attainment levels using the program's approved attainment thresholds.
- Combine the CE and SEE levels using the SAR's 40:60 weighting.
- Compare the result with the approved target, record observations and identify actions for any gap.

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9.3 Distribution of marks for theory & practical course evaluation

	Type of Assessment Tool		Frequency	Max Marks	Evidence Collected
Direct Assessment Methods	CE	Internal Assessment Test	Twice	30	Answer Sheets
		Assignment/ Quiz	Once	5	Assignment Reports/ Quiz Answers
		Attendance	Entire Semester	5	Attendance File
	SE E	Semester End Examination covering full syllabus	Once at the end of the course	60	Answer Sheets
Indirect Assessment Methods		End of the Course	Once at the end of the course	5	Response through Questionnaire

Distribution of marks for theory course evaluation

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	Type of Assessment Tool		Frequency	Max Marks	Evidence Collected
Direct Assessment Methods	C E	Internal Assessment Test	Twice	20	Answer Sheets
		Mini Project	Thrice	60	Presentation & Project Reports
		Main Project (Full Time Project)	Thrice	450	Presentation & Project Reports
	SE E	Semester End Examination covering full syllabus	Once at the end of the course	30	Answer Sheets
		Mini Project	Once	40	Presentation & Project Reports
		Main Project (Full Time Project)	Once	300	Presentation & Project Reports
Indirect Assessment Methods		End of the Course	Once at the end of the course	5	Response through Questionnaire

Distribution of marks for practical

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9.4 CO attainment calculation

The attainment levels for Course Outcomes are defined based on the percentage of students scoring 50% and above of the maximum marks in the assessment. The preliminary level set for attainment of course outcomes is as follows:

Attainment Level	Description with Range
1	If the percentage of the students that have attained their targets is between 40% and 59%.
2	If the percentage of the students that have attained their targets is between 60% and 79%.
3	If the percentage of the students that have attained their targets is equal or higher than 80%.

Attainment Levels

The target attainment levels are the same for both internal and university examinations during the assessment years. These levels are reviewed annually based on students' performance, and the target attainment levels may be revised to enhance course outcomes.

The attainment of course outcomes is evaluated through two components: Continuous Internal Evaluation and the Semester End Examination.

The SAR specifies a 40% contribution from Continuous Evaluation (CE) and a 60% contribution from the Semester End Examination (SEE) to final CO attainment.

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Component	Weight
Continuous Evaluation (CE)	40%
Semester End Examination (SEE)	60%

Formula: Final CO attainment = $(0.40 \times \text{CE attainment level}) + (0.60 \times \text{SEE attainment level})$.

Example stated in the SAR: CE attainment level = 2 and SEE attainment level = 3.
Final CO attainment = $(0.40 \times 2) + (0.60 \times 3) = 0.8 + 1.8 = 2.6$.

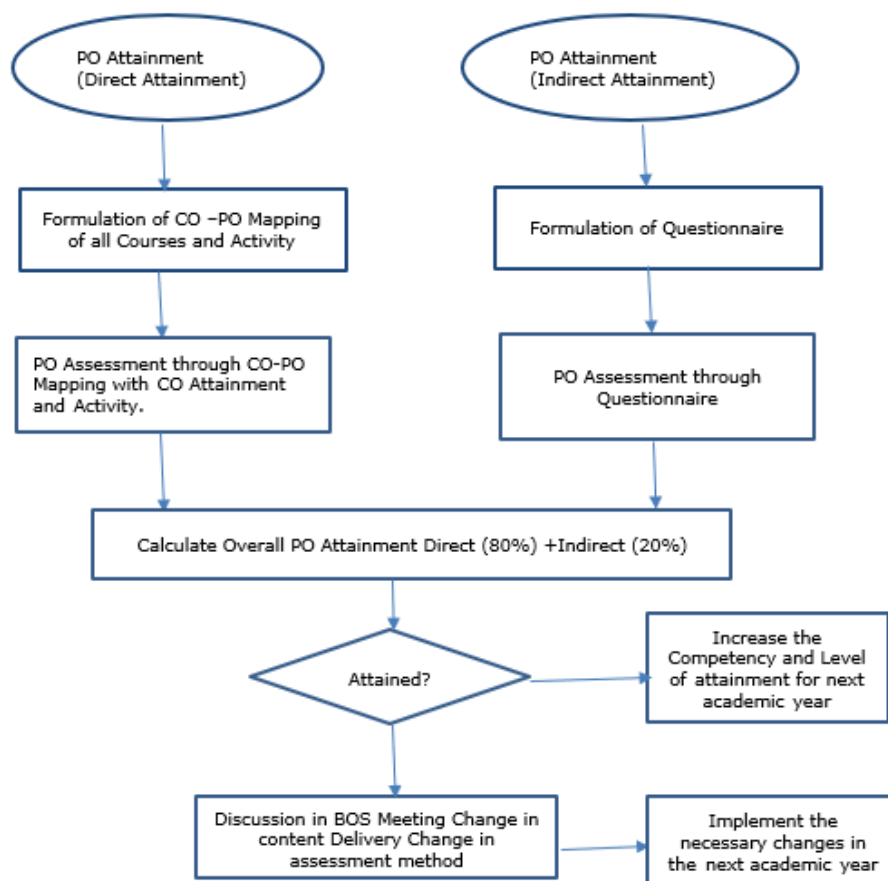
9.5 Attainment thresholds

The CO attainment levels are based on the percentage of students scoring 50% and above of the maximum marks, and that targets are reviewed annually. The complete numerical CO-level threshold table was not available as clear text in the supplied SAR extraction. Accordingly, this manual does not fabricate the missing percentage bands. The program should insert the exact approved table from the official SAR/course assessment procedure before controlled release.

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10. Program Outcome Attainment

10.1 Assessment Tools and Processes Used for Assessing the Attainment of Each PO



The process for Program Outcomes Attainment

1. Direct Method: (A) Internal Assessment **(B)** University Assessment

2. Indirect Method: (A) Course End Survey **(B)** Graduate / Exit Survey

Each Program Outcome (PO) is evaluated using direct assessment methods conducted across multiple courses. In addition, indirect assessment methods are employed to capture students' and stakeholders' feedback. The table presents the direct assessment measures obtained from students along with the corresponding indirect measurement methods.

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		Tools	To whom	Documentati on	Frequency of assessment
Direct Assessment	C E	Internal Assessme nt	Studen ts	Question papers	Twice in every semester
		Lab test		Question papers with the Problem Definition	Twice in semester
		Mini Projects		Reports	During the whole semester (Pre Final Semester)
		Main Projects		Reports	During the whole semester (Final Semester)
	S E E	University Theory Direct Assessment	Studen ts	Question papers	Odd Sem: Oct - Jan Even Sem :Mar-June
		University Practical Examinati ons		Question papers with the Problem Definition	Odd Sem: Oct - Jan Even Sem : Mar-June

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		University Practical Examinati ons Projects		Reports	Odd Sem: Oct - Jan Even Sem : Mar-June
Indirect Assessment		Course End Survey	Studen ts	Questionnair e	End of the Semester for each course
		Graduate Survey		Questionnair e	conducted every year for final semester students
		Activity Feedback / assessme nt		Depending on the activity	Depending on the discussion in the department few courses are suggested with OBE activity. This also includes industrial visit/SDP/Wor kshops etc.,

Evaluation of attainment of Program Outcomes

Sl. No.	Assessment Tools	Frequency of Assessment Processes Carried out
1.	Internal Assessment	Twice in every semester

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2.	University Assessment	Once in a semester
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Direct Method comprises tools

Sl. No.	Assessment Tools	Frequency of Assessment Processes Carried out
1.	Graduate/Exit survey	Once in a Year
2.	Course end Survey	For every course in the semester
3.	Activities conducted for the courses suggested by BOS	For identified courses in the semester

Indirect Method comprises tools

Direct Method:

Process used for calculating CO-PO in digitally maintained assessment records sheet (Direct Measures)

- Target is set to 50% after having brainstorming with all the course co-coordinators.
- Attainment Level 1 - If the percentage of the students that have attained their targets is between 40% and 59%.
- Attainment Level 2 - If the percentage of the students that have attained their targets is between 60% and 79%.
- Attainment Level 3 - If the percentage of the students that have attained their targets is equal or higher than 80%.
- In overall attainment: 40%, 60% weightages are given to Internal Test and University Examination respectively.

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Direct Method to Calculate Program Outcomes are assessed in following steps: -

1. Course outcomes mapping to individual PO are considered.
2. The Attainment of PO with internal exams are calculated as follows:

$$\begin{aligned} & PO \text{ Attainment(Direct)} \\ &= \frac{CO - PO \text{ mapping value} * \text{Actual CO attainment value}}{\text{Number of Attainment levels (3)}} \end{aligned}$$

Equation Used for Direct Method to Calculate Program Outcomes

3. Step 2 is repeated for PO Attainment of University Assessment as well.
4. Direct PO attainment is calculated by considering Summation of a weighted average of 60% of Step 3 value and 40% of Step 2.
5. Direct PO attainment is calculated by repeating Step 2, Step 3 and Step 4.

Indirect Method:

Indirect Method to Calculate Program Outcomes are assessed in following steps: -

Graduate Exit survey:

1. Questions are framed keeping PO's as reference.
2. Responses in category: "Strongly agree" as '3'," Agree" as '2' "Satisfactory" as '1'.
3. Each course coordinator collects graduate exit survey for their respective courses.
4. The calculations will be done based on the options provided under each question.
5. Average of all graduate exit surveys will be taken for final PO attainment.

Course End Survey:

1. Each course coordinator collects course exit survey for their respective courses.

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2. Questions are framed by course coordinator with respect to Course Outcomes; in turn it will be mapped to POs.
3. The calculations will be done based on the options provided under each question.
4. Average of all course exit surveys will be taken for final PO attainment.

FINAL PO Attainment level:

Final Program Outcomes are assessed in following steps:

Final PO attainment is calculated by considering Summation of a weighted average of 80% to PO attainment in Direct method and 20% to PO attainment in Indirect method.

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10.2 Direct PO attainment thresholds

The Sspecifies a target of 50% after discussion with course coordinators and the following bands for the percentage of students attaining their targets:

Attainment level	Percentage of students attaining the target
Level 1	40%–59%
Level 2	60%–79%
Level 3	80% or higher

The SAR assigns 40% weight to internal assessment and 60% to university examination for overall direct attainment.

10.3 Review of attainment results

- Review outcomes course-wise and program-wise, with the correct PO scheme and cohort identified.
- Identify outcomes below target and outcomes where attainment is stable or improving.
- Use survey results and assessment evidence to interpret the numerical attainment values.
- Document the identified gap, root-cause analysis, action, responsible person/body, timeline and follow-up evidence.
- Use later attainment results to determine whether the action was effective.

11. Continuous Improvement

The SAR describes continuous improvement as an evidence-based process informed by student intake quality, success without backlogs, placement/higher studies/entrepreneurship, faculty qualification and research, academic audits, and PO attainment analysis.

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1.1 Improvement cycle

1. Collect evidence from assessment, surveys, academic audits, student performance, stakeholder feedback and program activities.
2. Analyse evidence against approved targets and compare trends across relevant cohorts/academic years.
3. Identify gaps, strengths and likely causes; distinguish a measured finding from an assumption.
4. Propose corrective or enhancement actions appropriate to the gap.
5. Record the approving body/person, responsible owner, timeline and evidence required.
6. Implement the action and retain supporting records.
7. Review subsequent data to evaluate the effectiveness of the action and decide whether further action is required.



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