

Process for measuring the attainment of Course Outcomes (COs)

1. For calculating the COs attainment, all the students who attended the exam shall be considered for the calculation of COs attainment. Absentees should not be considered for the evaluation of COs.
2. For the Mid-term examinations and for Semester End Examinations (Part – A and Part - B), CO-wise attainment shall be calculated. Marks obtained in each question shall be taken into consideration for evaluating the attainment of COs.
3. For the Assignments, the overall marks secured shall be considered for the CO attainment which shall be made applicable to all COs and it would be presumed that all COs have the same attainment level. This is to reduce the complexity of calculation of COs attainment.
4. For measuring the attainments of COs of a theory course (both in CIE and SEE), the **targets** can be defined differently for each CO or the same target can be set for all COs as per the deliberations that took place in the Course Coordinator’s meeting with the instructors, approved by PAC. The guidelines followed for fixing the targets are given below:
 - Mid Paper Subjective: 60% of maximum marks related to each CO
 - Assignments: 60% of maximum marks (3 marks out of 5)
 - Semester End Examination: 60% of maximum marks related to each CO or any other target proposed by the course coordinator and approved by PAC.
 1. The attainment levels are to be fixed using the above targets as follows:

Direct Attainment	
Semester End Exam	
Level indicator for CO attainment	
Level 1	≥ 40% and < 50% of Students attain the target Marks
Level 2	≥ 50% and < 60% of Students attain the target Marks
Level 3	≥ 60% of Students attain the target Marks
Mid-term Exams – Subjective and Assignments	
Level indicator for CO attainment	
Level 1	≥ 60% and < 70% of students attain the target
Level 2	≥ 70% to < 80% of students attain the target
Level 3	≥ 80% of students attain the target

Indirect Attainment – Course End Survey, CRC and TLP feedback	
Level indicator for CO attainment	
Level 1	≥ 60% and < 70% of feedback score
Level 2	≥ 70% and < 80% of feedback score
Level 3	≥ 80% of feedback score

2. Whenever a choice is given in the question paper and if a student answers more than one question against one question which he is supposed to answer, the question in which the student earned more marks shall be considered for the computation of CO attainment, leaving the marks obtained in other question(s). Similarly if a student doesn't attempt any question when he is expected to answer one out of the two questions that are given, zero marks have to be awarded for the student in either of the questions and accordingly the CO related to the question shall be evaluated.
3. In measuring the attainment of each CO,
 - 75% of weightage shall be given for the Direct Assessment that includes attainments in mid-term examinations (subjective), semester end examinations and assignments
 - 25% weightage for Indirect Assessment that includes students' online feedback on TLP (10%), CRC feedback (10%) and Course End Survey feedback (5%).
4. For determining the Direct Assessment
 - 60% weightage shall be given for the Semester End Examination and
 - 40% weightage for the internal marks that includes
 - Mid-term examinations subjective (30%),
 - Assignments (10%) and
5. Both mid-1 and mid -2 shall be considered together in measuring the attainment levels of COs.

Direct Attainment of CO = 0.3* Mid-term Subjective + 0.1* Assignment + 0.6* End Sem. Exam.

Indirect Attainment of CO = 0.4* Feedback on TLP+ 0.4* Feedback on CRC + 0.2* Feedback on Course End Survey

Overall CO Attainment = 0.75* Direct Attainment Level + 0.25* Indirect Attainment Level.
6. For internal and semester end practical examinations, 60% of maximum marks shall be kept as **target** for measuring the attainment, the same way it is defined for theory courses. Out of the 100 marks allotted for laboratories, 70 marks shall be awarded based on the SEE, 15 marks based on CIE and the remaining 15 marks by way of conducting two mid-term practical examinations each for 15 marks and taking the average of the two. In laboratories, either in the internal or external practical examination, a student will be asked to perform only one experiment out of the 12 or 14 experiments that are listed in the syllabus book. As it is not possible to measure the attainments of all COs that are related to different experiments, it is assumed that the attainment level obtained for a particular CO that is related to an experiment which is given during examination, is equally applicable for the remaining COs. That is if a student gets 70% of marks (Level 2) in the internal examination and 60% of marks (Level 1)

in the end semester practical examination, the attainment of each CO is calculated as: $0.4 * 2 + 0.6 * 1 = 1.4$ (Direct measurement). If the attainments in Course End Survey, CRC Feedback and Feedback on TLP are 75% (Level 2), 65% (Level 1) and 83% (Level 3) respectively. The Indirect Attainment can be calculated as: $0.4 * 2 + 0.4 * 1 + 0.2 * 3 = 1.8$.

The overall course attainment (which also is the attainment of each CO) = $0.75 * 1.4 + 0.25 * 1.8 = 1.5$

Note: Similar procedure has to be adopted for Projects, Seminars, Mini Projects, Internships and other such similar courses.

Example: Attainments measured of a CO in a particular course are as indicated below. The same procedure has to be adopted for measuring the remaining COs' attainment levels.

Components that contribute to Direct Attainment of CO

Mid-term Subjective= 85% (LEVEL 3)

Assignment = 96% (LEVEL 3)

End Sem. Exam = 40% (LEVEL 1)

Components that contribute to the Indirect Attainment of CO

Feedback on TLP = 95% (LEVEL 3)

Course End Survey = 88% (LEVEL 3)

Feedback in CRC = 82% (Level 3)

Direct Attainment of CO = $0.3*3 + 0.1*3 + 0.6*1 = 1.8$

Direct Attainment Level = 1.8 (According to Target Levels Set)

Indirect Attainment of CO = $0.4*3 + 0.4*3 + 0.2*3 = 3$

Overall CO Attainment = $0.75* \text{Direct Attainment Level (1.8)} + 0.25* \text{Indirect Attainment Level (3)} = 2.1$ (on a scale of 3)

Direct		Level of attainment	Indirect		Level of attainment
Subject	85%	3	TLP	95%	3
Assignment	96%	3	CES	88%	3
End Sem.	40%	1	CRC	82%	3

Overall CO attainment	
Direct Level Attained	1.8
Indirect Level Attained	3
$0.75 * 1.8 + 0.25 * 3$	2.1