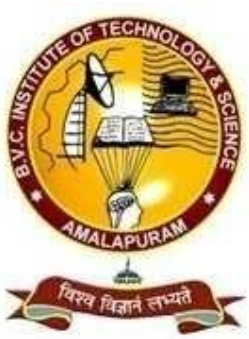
ASSESSMENT MANUAL

R20 REGULATION



DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

AMALAPURAM

1. INTRODUCTION

Outcome Based Education (OBE)is an educational model that forms the base of a quality education system. There is no single specified style of teaching or assessment in OBE. All educational activities carried out in OBE should help the students to achieve the set goals. The faculty may adapt the role of instructor, trainer, facilitator, and/or mentor, based on the outcomes targeted.

OBE enhances the traditional methods and focuses on what the Institute provides to students. It shows the success by making or demonstrating outcomes using statements "able to do" in favor of students. OBE provides clear standards for observable and measurable outcomes.

WHY OBE?

- International recognition and global employment opportunities.
- More employable and innovative graduates with professional and soft skills, social responsibility and ethics.
- Better visibility and reputation of the technical institution among stakeholders.
- Improving the commitment and involvement of all the stakeholders.
- Enabling graduates to excel in their profession and accomplish greater heights in their careers.
- Preparing graduates for the leadership positions and challenging them and making them aware of the opportunities in the technology development.

BENEFITS OF OBE

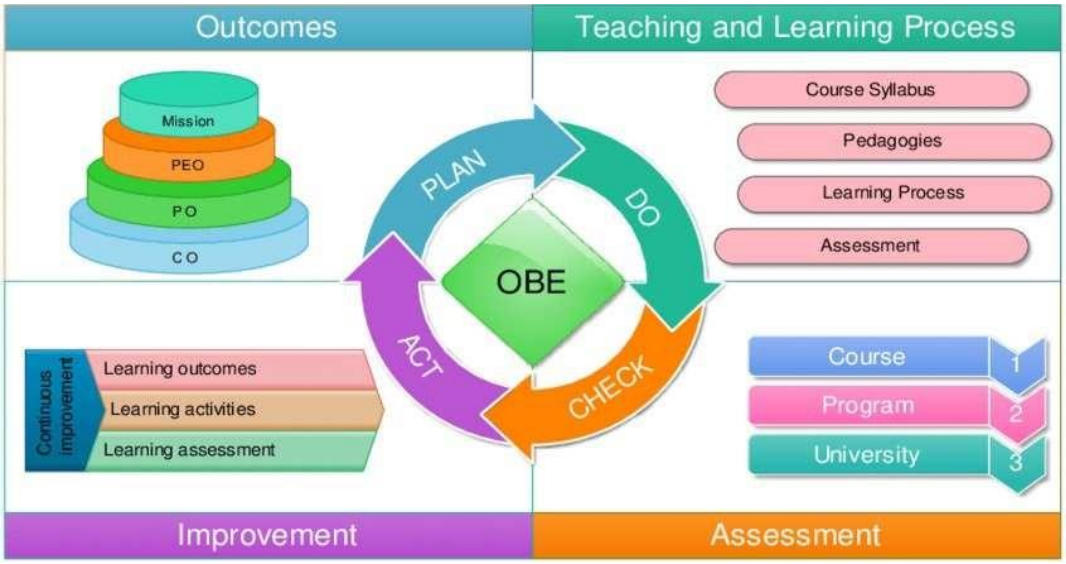
- **Clarity:** The focus on outcome creates · a clear expectation of what needs to be accomplished by the end of the course.
- **Flexibility:** With a clear sense of what needs to be accomplished, instructors will be able to structure their lessons around the students' needs.
- **Comparison:** OBE can be compared across the individual, class, batch, program and institute levels.
- **Involvement:** Students are expected to do their own learning. Increased student involvement allows them to feel responsible for their own learning, and they should learn more through this individual learning.

FEATURES OF OBE

OBE is an educational process that focuses on what students can do or the qualities they should develop after they are taught.

OBE involves the restructuring of curriculum, assessment and reporting practices in education to reflect the achievement of higher order learning and mastery rather than accumulation of course credits.

- Both structures and curricula are designed to achieve those capabilities or qualities.
- Discourages traditional education approaches based on direct instruction of facts and standard methods.
- It requires that the students demonstrate that they have learnt the required skills and content.



EXPECTATIONS OF STUDENTS UNDER OBE – THE OUTCOME

- Students are expected to be able to do more challenging tasks other than memorize and reproduce what was taught.
- Students should be able to: write project proposals, complete projects, analyze case studies, give case presentations, show their abilities to think, question, research, and make decisions based on the findings.
- Be more creative, able to analyze and synthesize information.
- Able to plan and organize tasks, able to work in a team as a community or in entrepreneurial service teams to propose solutions to problems and market their solutions.
- Students should be enriched on three dimensional scales of knowledge, skill and attitude throughout the course or programme.

INSTITUTE VISION AND MISSION

Vision

To be a Premier Institution in Education and Research, producing global leaders in Engineering, Technology and Management

Mission

IM 1. Imparting quality and outcome-based education towards academic excellence

IM 2. Inculcating team spirit and professional ethics among stakeholders.

IM 3. Strengthening links with industry through internships and collaborative development works.

DEPARTMENT VISION AND MISSION

Vision

To become a recognized centre for quality electronics and communication engineering education and develop ethically sound, globally competent and socially responsible engineers

Mission

DM 1. To provide learner-centric Electronics and Communication Engineering education to overcome the professional challenges

DM 2. To pursue research and new technologies in Electronics & Communication Engineering and related disciplines to serve the society, industry, government and scientific community needs.

DM 3. To promote activities for overall development of stakeholder with ethical and professional responsibility.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1 Graduates will excel in their professional career and/or higher education by applying knowledge of Mathematical, Scientific and Electronics and Communication engineering.

PEO 2 Graduates will analyse and solve real life problems, adopt the modern engineering tools to design systems that are economically feasible and socially acceptable

PEO 3 Graduates will exhibit professionalism, social, ethical responsibility and inter-personal skills to relate engineering issues in broader social context.

PEO 4 Graduates will have the zeal and motivation to get involved in lifelong learning process to become Innovators, Entrepreneurs and Leaders.

PROGRAM OUTCOMES (POs)

PO1 **ENGINEERING KNOWLEDGE**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 **PROBLEM ANALYSIS**: Identify, formulate, research literature, and analyse 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 specified needs with appropriate consideration for the public health and safety, and the cultural, societal, 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 modelling to complex engineering activities with an understanding of the limitations.

PO6 **THE ENGINEER AND SOCIETY**: 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, 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 (PSOs)

PSO 1 Professional Skills: An ability to design, analyse and implement Analog and Digital Electronics systems, Communication, Signal processing, VLSI, Embedded and IoT systems using hardware and software.

PSO 2 Soft-Skills & Ethics: Ability to communicate effectively and practice professional ethics for societal benefit.

OBE FRAMEWORK OF THE INSTITUTE

The adoption of OBE framework

I. Before Start of Semester

- Competency Matrix
- Subject Preference form
- Subject Allotment by HoD (Based on Competency)
- Subject confirmation by faculty
- Curriculum, Lesson Plan, Course file, Authentication by HoD

II. During Semester

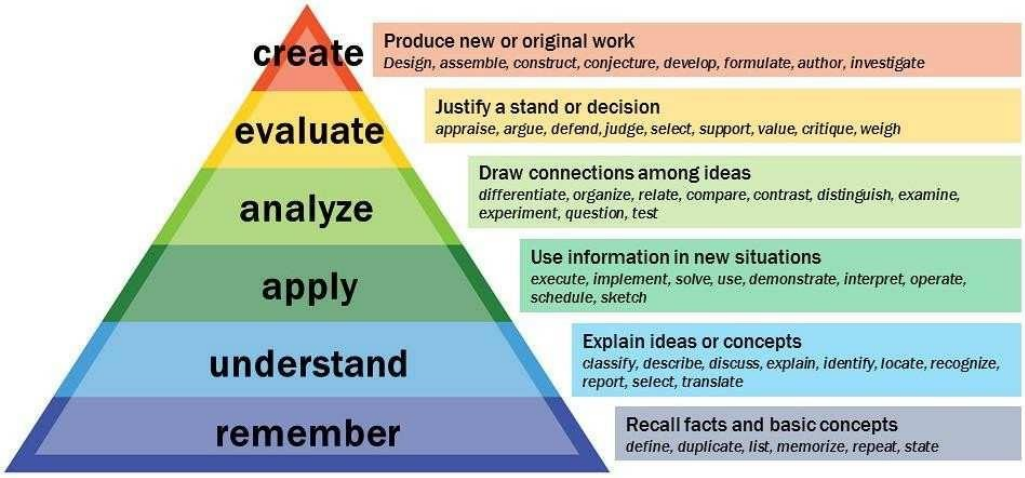
- Verification of Course file/Lesson plan
- Approve & allow to teach
- Identifying student competency & action taken
- Execution of all other activities

III. Till End of Semester

- Implementation & Verification in classrooms and labs
- If any difficulty faced, Resolve with Subject Expert/Program Coordinator/HoD
- Assessment and Evaluation, CO-PO attainments & analysis
- Submission of Analysis to PAQIC/HoD

REVISED BLOOM'S TAXONOMY (RBT)

Bloom's taxonomy is considered as the global language for education. Bloom's Taxonomy is frequently used by teachers in writing the course outcomes as it provides a readymade structure and list of action verbs. A summary of Anderson and Krathwohl's revised version of Bloom's taxonomy of critical thinking is provided in below Figure 1:



Definitions of the different levels of thinking skills in Bloom's taxonomy

- **Remember:** Recalling relevant terminology, specific facts, or different procedures related to information and/or course topics. At this level, a student can remember something, but may not really understand it.
- **Understand:** The ability to grasp the meaning of information (facts, definitions, concepts, etc.) that has been presented.
- **Apply:** Being able to use previously learned information in different situations or in problem solving.
- **Analyze:** The ability to break information down into its component parts. Analysis also refers to the process of examining information in order to make conclusions regarding cause and effect, interpreting motives, making inferences, or finding evidence to support statements/arguments.
- **Evaluate:** Being able to judge the value of information and/or sources of information based on personal values or opinions.
- **Create:** The ability to creatively or uniquely apply prior knowledge and/or skills to produce new and original thoughts, ideas, processes, etc. At this level, students are involved in creating their own thoughts and ideas.

The cognitive process dimensions- categories					
Lower Order of Thinking (LOT)			**Higher Order of Thinking (HOT)**		
L1: REMEMBER	**L2: UNDERSTAND**	**L3: APPLY**	**L4: ANALYSE**	**L5: EVALUATE**	**L6: CREATE**
• Recognizing (identifying) • Recalling (retrieving)	• Interpreting • Exemplifying • Classifying • Summarizing • Inferring (concluding) • Comparing • Explaining	• Executing • Implementing	• Differentiating • Organizing • Attributing	• Checking (coordinating, detecting, testing, monitoring) • Critiquing (judging)	• Planning • Generating • Producing (constructing)

The Knowledge Dimension			
General Categories			
FACTUAL	**CONCEPTUAL**	**PROCEDURAL**	**METACOGNITIVE**
• Knowledge of terminologies • Knowledge of specific details & elements	• Knowledge of classifications and categories • Knowledge of principles & generalizations • Knowledge of theories, models & structures	• Knowledge of subject specific skills and algorithms • Knowledge of subject specific techniques and methods • Knowledge of criteria for determining when to use appropriate procedures	• Strategic Knowledge • Knowledge about cognitive task, including appropriate contextual and conditional Knowledge • Self- Knowledge

The Knowledge Dimension			
Categories specific to Engineering			
FUNDAMENTAL DESIGN CONCEPTS	**CRITERIA AND SPECIFICATIONS**	**PRACTICAL CONSTRAINTS**	**DESIGN INSTRUMENTATLITIES**
• Operational principles of devices and components within a device or system	• Knowledge of translating the qualitative goals for the device into specific, quantitative goals	• Knowledge of an array of less sharply defined considerations derived from experience in practice, considerations that frequently do not lend themselves to theorizing, tabulation, or programming into a computer.	• Procedural knowledge including the procedures, way of thinking, and judgmental skills by which it is done.

List of Action Words Related to Critical Thinking Skills

Here is a list of action words that can be used when creating the expected student learning outcomes related to critical thinking skills in a course. These terms are organized according to the different levels of higher-order thinking skills contained in Anderson and Krathwohl's (2001) revised version of Bloom's taxonomy.

L1	L2	L3	L4	L5	L6
REMEMBER	**UNDERSTAND**	**APPLY**	**ANALYZE**	**EVALUATE**	**CREATE**
Arrange Cite	Alter	Acquire	Analyze	Appraise	Create
Define	Classify	Apply	Appraise	Argue	Arrange
Describe	Compare	Calculate	Ascertain	Assess	Assemble
Duplicate	Convert	Change	Associate	Attach	Collect
Identify	Defend	Chart	Breakdown	Choose	Combine
Label	Describe	Choose	Calculate	Compare	Comply
List	Discuss	Compute	Categorize	Conclude	Compose
Memorize	Estimate	Demonstrate	Classify	Criticize	Conceive
Match Name	Explain	Discover	Compare	Critique	Construct

Order	Express Extend	Dramatize	Conclude	Deduce	Create
Outline	Generalized	Draw	Contrast	Defend	Derive
Pronounce	Give Examples	Employ	Criticize	Estimate	Design
Quote	Indicate	Illustrate	Designate	Evaluate	Develop
Recall	Interpret	Interpret	Determine	Grade	Devise
Recite	Locate	Manipulate	Diagnose	Judge	Expand
Recognize	Paraphrase	Modify	Diagram	Justify	Extend
Record	Recognize	Operate	Differentiate	Measure	Formulate
Repeat	Rephrase	Practice	Discriminate	Predict	Generalize
Reproduce	Restate	Prepare	Distinguish	Prove	Generate
State	Reword	Produce	Divide	Rate	Integrate
Tabulate	Rewrite	Schedule	Examine	Recommend	Invent
	Select	Show	Experiment	Reframe	Modify
	Summarize	Sketch	Explain	Review	Organize
	Translate	Solve	Explore	Support	Originate
	Write	Use	Find Infer	Test	Plan Prepare
			Investigate	Value	Produce
			Outline	Weigh	Project
			Point out		Rearrange
			Question		Reconstruct
			Reduce		Reorganize
			Relate		Revise
			Separate		Setup
			Specify		Synthesize
			Subdivide		
			Test		

GUIDELINES FOR WRITING COURSE OUTCOME STATEMENTS

What are Course Outcomes?

- Course Outcomes (COs) are what the student should be able to do at the end of a course
- It is an effective ability, including attributes, skills and knowledge to successfully carry out the
- identified activity
- The most important aspect of a CO is that it should be observable and measurable

Structure of a CO statement

Action: Represents a cognitive/ affective/ psychomotor activity the learner should perform. An action is indicated by an action verb, occasionally two, representing the concerned cognitive
process(es).

Knowledge: Represents the specific knowledge from any one or more of the eight knowledge categories

Condition: Represents the process the learner is expected to follow or the condition under which to perform the action (This is an optional element of CO)

Criteria: Represent the parameters that characterize the acceptability levels of performing the
action (This is an optional element of CO)

While writing COs the following questions/points must be addressed properly.

Specific	Is there a description of precise behavior and the situation it will be performed in? Is it concrete, detailed, focused and defined?
Measurable	Can the performance of the outcome be observed and measured?
Achievable	With a reasonable amount of efforts and application can the outcome be achieved? Are you attempting too much?
Relevant	Is the outcome important or worthwhile to the learner or stake holder? Is it possible to achieve this outcome?
Time-Bound	Is there a time limit, rate, number, percentage or frequency clearly stated? When will this outcome be accomplished?

Dos and Don'ts

- Use only one action verb
- Do not use words including 'like', 'such as', 'different', 'various' 'etc.' with respect to knowledge elements. Enumerate all the relevant knowledge elements.
- Put in effort to make the CO statement as detailed as possible, and measurable.
- Do not make it either too abstract or too specific

Check List

- ✓ Does the CO begin with an action verb?
- ✓ Is the CO stated in terms of student performance (rather than teacher performance or course content to be covered)?
- ✓ Is the CO stated as a learning product rather than as a learning process?
- ✓ Is the CO stated at the proper level of generality, and relatively independent of other COs?
- ✓ Is the CO attainable in the given context (students' background, prerequisite competences, facilities, time available and so on)?

Number of COs for a Course

- Too small a number of COs do not capture the course in sufficient detail and may not serve instruction design that well.
- Too many COs make all the processes related to assessment design and computation of attainment of COs messy and demanding.
- A 3:0:0, 3:1:0 and 3:0:1 course should have 5 or 6 course outcomes.

CO – PO Mapping Guidelines

Consider any Two Minimum Criteria for CO – PO Mapping Justification

- **Contact Hours: Lectures, Tutorials and Practical**

Level	Contact Hours in Percentage (including Lecture, Tutorial & Practical)
No mapping (-)	< 5%
Low (1)	5- 15%
Medium (2)	15- 25%
High (3)	>25%

Description:

Number of Lectures = 3per week x 16 weeks = 48 Hours Tutorial = 1Hr x 16 Weeks = 16 Hours

Practical = 2Hr x 16 Week = 32 Hours Total Hrs. = 48+16+32 = 96 Hrs.

Example: Let, CO1 related points are engaged in 10 Lectures + 1 Tutorial and 2 Practical Hours

Then contact hours = 10+1+2x2 = 15 hours

Therefore, contact hours in percentage = (15/96) x 100 = 15.65 %. Medium mapping (2)

- **Number of Assessment Tools used**

Level	**Assessment tools used to assess the CO**
No mapping (-)	0
Low (1)	1 or 2
Medium (2)	3
High (3)	4 or more

CO ASSESSMENT PROCESS

CO Assessment process is done based on the performance of the student using Direct Method (MID exam, Assignment, Semester End Examination) and Indirect Method (Course Semester End Feedback)

For the assessment of Course Outcomes, 80% weightage is given to Direct Assessment and 20% weightage is given to Indirect Assessment.

List of Assessment Processes

Course Type	Direct Assessment Methods		Indirect Assessment Methods
	Internal	External	
Theory Course	✓ Mid Examinations ✓ Assignment	✓ Semester End Examination	✓ Course End Feedback
Lab Course	✓ Day – to – Day work ✓ Record ✓ Internal Examination	✓ Semester End Examination	✓ Course End Feedback
Project	✓ Synopsis ✓ Mid Term Evaluation ✓ Internal Evaluation	✓ End Evaluation	NA

Distribution and Weightage of marks:

The assessment of the student's performance in each course will be based on Continuous Internal Evaluation (CIE) and Semester-End Examination (SEE). The performance of a student in each semester shall be evaluated subject–wise with a maximum of 100 marks for theory subject and 50 marks for practical subject. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End Examinations.

S. No	Components	Internal	External	Total
1	Theory	30	70	100
2	Engineering Graphics/Design/Drawing	30	70	100
3	Practical	15	35	50
4	Mini Project/Internship/Industrial Training/ Skill Development programmes/Research Project	-	50	50
5	Project Work	60	140	200

The Quality / Relevance of assessment processes & tools used

Theory Courses Evaluation

For theory subjects, during a semester, there shall be two mid-term examinations. Each mid-term examination consists of (i) one online objective examination (ii) one descriptive examination and (iii) one assignment. The online examination (objective) shall be 10 marks and descriptive examination shall be for 15 marks with a total duration of 1 hour 50 minutes (20 minutes for objective and 90 minutes for descriptive paper).

The first online examination (objective) is set with 20 multiple choice questions for 10 marks (20 questions x ½ marks) from first two and half units (50% of the syllabus) and it is conducted by **University Examination Section.** The descriptive examination is set with 3 full questions for 5 marks each from first two and half units (50% of the syllabus), the student has to answer all questions. In the similar lines, the second online and descriptive examinations shall be conducted on the rest of the syllabus.

The assignment is given by the concerned class teacher for five marks from first two and half units (50% of the syllabus). The second assignment shall be given from rest of the syllabus. The first assignment should be submitted before the conduct of the first mid-term examination, and the second assignment should be submitted before the conduct of the second mid-term examination.

The total marks secured by the student in each mid-term examination are evaluated for 30 marks. The first mid marks (Mid-1) consisting of marks of online objective examination, descriptive examination and assignment shall be submitted to the University examination section within one week after completion of first mid examination.

The mid marks submitted to the University examination section shall be displayed in the concerned college notice boards for the benefit of the students.

If any discrepancy found in the submitted Mid-1 marks, it shall be brought to the notice of university examination section within one week from the submission.

Second mid marks (Mid-2) consisting of marks of online objective examination, descriptive examination and assignment shall also be submitted to University examination section within one week after completion of second mid examination and it shall be displayed in the notice boards. If any discrepancy found in the submitted mid-2 marks, it shall be brought to the notice of university examination section within one week from the submission.

Internal marks can be calculated with 80% weightage for better of the two mids and 20% Weightage for another mid exam.

Example:

Mid-1 marks = Marks secured in (online examination – 1+descriptive examination – 1+one assignment-1)

Mid-2 marks = Marks secured in (online examination – 2+descriptive examination – 2+one assignment – 2)

Final internal Marks = (Best of (Mid-1/Mid-2) marks x 0.8 + Least of (Mid-1/Mid-2) marks x 0.2)

With the above criteria, university examination section will send mid marks of all subjects in consolidated form to all the concerned colleges and same shall be displayed in the concerned college notice boards. If any discrepancy found, it shall be brought to the notice of university examination section through proper channel within one week with all proofs. Discrepancies brought after the given deadline will not be entertained under any circumstances.

Semester End Theory Examinations Evaluation:

The semester end examinations will be conducted university examination section for 70 marks consists of five questions carrying 14 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

Direct Method:

Evaluation	**Exam Mode**	**Max. Marks**	**Frequency**	**Duration**
Internal	MID (Descriptive)	15	Twice per Semester	90 min.
	Objective Quiz (MCQ)	10	Twice per Semester	20 min.
	Assignment	5	Six per Course	-
	Internal Assessment (30 marks) = 80% of Best Mid Marks + 20% of the other Mid Marks			
External	Answer any one from each unit carries 14 Marks	70	Once per Semester	180 min.

Quality of the Assessment Tool

- Due weightage is given to all the CO's covered by the portion meant for each internal exam.
- Each CO to which the Question belongs to is mentioned along with Blooms taxonomy level.
- Course coordinator along with its team validates the Question paper to ensure the desired standard from outcome attainment perspective as well as learning levels perspective.

Laboratory Course Evaluation (LC)

For practical subjects there shall be continuous evaluation during the semester for 15 internal marks and 35 end examination marks. The internal 15 marks shall be awarded as follows: day to day work - 5 marks, Record-5 marks and the remaining 5 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner appointed by controller of examinations, JNTUK.

Direct Method:

Evaluation	Exam Mode	Max. Marks	Frequency	Duration
Internal	Day – to – Day work	5	Once per Experiment	150 min.
	Laboratory Record	5	Once per Experiment	
	Internal Exam	5	Once per Semester	180 min.
External	End Exam	35	Once per Semester	180 min.

Rubrics used for laboratory Course

Parameters	Marks	Poor	Average	Good
Students' observation book preparation	5	Insufficient	Fair	Good
		0 – 2 Marks	3 – 4 Marks	5 Marks
Attendance	5	75 % - 80 %	80 % - 90 %	90 % - 100 %
		0 – 2 Marks	3 – 4 Marks	5 Marks
Record	5	Insufficient recording of content, calculations and conclusion	Fair recording of content, calculations and conclusion	Good recording of content, calculations and conclusion

		0 – 2 Marks	3 – 4 Marks	5 Marks

Rubrics used for Laboratory Internal Examination

Parameters	**Marks**	**Poor**	**Average**	**Good**
Experiment writeup	3	Not able to write procedure and calculations	Able to write procedure but not able to show calculations	Able to write procedure and show calculations
		0 – 1 Marks	1 – 2 Marks	3 Marks
Execution	4	Not executed	Partially executed	Completely executed
		0 – 1 Marks	2 – 3 Marks	4 – 5 Marks
Viva – Voce	3	Insufficient Knowledge of experiment	Fair knowledge of experiment	Good knowledge of experiment
		0 – 1 Mark	1 – 2 Marks	3 Marks
50% is taken from the total marks				

CO Assessment Process for Engineering Drawing

For the subject having design and / or drawing (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 30 marks for internal evaluation (15 marks for continuous Assessment (day–to–day work) and 15 marks for internal tests) and 70 marks for end examination. There shall be two internal tests in a Semester for 15 marks each and final marks can be calculated with 80% weightage for better of the two tests and 20% weightage for other test and these are to be added to the marks obtained in day-to-day work.

Direct Method:

Evaluation	**Method**	**Max. Marks**	**Frequency**	**Duration**
Internal	Day-to-Daywork	15		
	Internal Test	15	Twice per semester	90Minutes
	Internal assessment (30marks) = 80% of Best Mid + 20% The other Mid			
External	Exam	70	Once per semester	3Hours

Mandatory Course (MC)

Environmental Sciences, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc non-credit (zero credits) mandatory courses. Environmental Sciences shall be offered compulsorily as mandatory course for all branches. A minimum of 75% attendance is mandatory in these subjects. There shall be an external examination for 70 marks and it shall be conducted by the college internally. Two internal examinations shall be conducted for 30 marks and a student has to secure at least 40% ofthe marks for passing the course. There is no online internal exam for mandatory courses. No marks or letter grade shall be printed in the transcripts for all mandatory non-credit courses, but only Completed (Y)/Not-completed (N) will be specified.

Direct Method:

Evaluation	Exam Mode	Max. Marks	Frequency	Duration
Internal	MID (Descriptive)	30	Twice per Semester	90 min.
	Internal Assessment (30 marks) = 80% of Best Mid Marks + 20% of the other Mid Marks			
External	Answer any one from each unit carries 14 Marks	70	Once per Semester	180 min.

Summer Internships

It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Industries, Hydel and thermal power projects and also in software MNCs in the area of concerned specialization of the UG programme. Students shall pursue this internship during summer vacation just before its offering as per course structure. The minimum duration of this course shall be at least 6 weeks. The student shall register for the internship as per course structure after commencement of academic year. A supervisor/mentor/advisor has to be allotted to guide the students for taking up the summer internship. The supervisor shall monitor the attendance of the students while taking up the internship. Attendance requirements are as per the norms of the University. After successful completion, students shall submit a summer internship technical report to the concerned department and appear for an oral presentation before the departmental committee consists of an external examiner appointed by the University; Head of the Department, supervisor of the internship and a

senior faculty member of the department. A certificate from industry/skill development center shall be included in the report. The report and the oral presentation shall carry 40% and 60% weightages respectively. It shall be evaluated for 50 external marks at the end of the semester. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the University.

Rubrics for Summer Internship

Parameter	**Rubric**			**Marks**
	Poor	**Average**	**Good**	
Project Report	Objectives not clear	Clear objectives and organized	Clear objectives, advanced technology based and organized	20
	1 – 6 Marks	7 – 14 Marks	15 – 20 Marks	
Presentation	Contents are inappropriate	Appropriate contents, not well arranged	Appropriate contents and well arranged	20
	1 – 6 Marks	7 – 14 Marks	15 – 20 Marks	
Queries answered	No answer or explanation	Inappropriate answer and explanation	Clear, concise answer with explanation and with supported facts	10
	1 – 3 Marks	4 – 6 Marks	7 – 10 Marks	

Job – Oriented Skill Course (SC)

The job-oriented skill courses may be registered at the college or at any accredited external agency. A student shall submit a record/report on the on the list skills learned. If the student completes job- oriented skill course at external agency, a certificate from the agency shall be included in the report. The course will be evaluated at the end of the semester for 50 marks (record: 15 marks and viva-voce: 35 marks) along with laboratory end examinations in the presence of external (appointed by the university) and internal examiner (course instructor or mentor). There are no internal marks for the job-oriented skill courses.

Rubrics for Job – Oriented Skill Course (SC)

Parameter	Rubric			Marks
	Poor	**Average**	**Good**	
Project Report	Objectives not clear	Clear objectives and organized	Clear objectives, advanced technology based and organized	15
	1 – 5 Marks	6 – 10 Marks	11 – 15 Marks	
Queries answered	No answer or explanation	Inappropriate answer and explanation	Clear, concise answer with explanation and with supported facts	35
	1 – 5 Marks	6 – 14 Marks	15 – 35 Marks	

Major Project (Project work, Seminar and internship in industry):

In the final semester, the student should mandatorily register and undergo internship and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship. The project report shall be evaluated with an external examiner.

Evaluation: The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the University and is evaluated for 140 marks.

CO Assessment Process for Project

Review #	Coverage Points	Marks	Weightage
1	Report	15	30%
2	Seminar	15	
3	Final Evaluation	30	
External Project Evaluation		140	70%
Total		200	100%

Rubrics for Project Internal Evaluation

Review #	Parameter	Rubric			Marks
		Poor	Average	Good	
1	Objectives, Project Synopsis, Literature Survey	Need Improvement	Clear and Moderate	Well defined and good	20
		0 – 7 Marks	8 – 14 Marks	15 – 20 Marks	
2	Proposed Methodology & Project execution progress	Need Improvement	Clear and Satisfactory	Well defined and good	20
		0 – 7 Marks	8 – 14 Marks	15 – 20 Marks	
3	Result, Conclusion and Presentation	Inappropriate	Average	Effective	20
		0 – 7 Marks	8 – 14 Marks	15 – 20 Marks	

COMMUNITY SERVICE PROJECT

Implementation of Community Service Project

1. Every student should put in a minimum of 180 hours for the Community Service Project during the summer vacation.
2. Each class/section should be assigned with a mentor.

3. Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, house-wives, etc
4. A log book has to be maintained by each of the student, where the activities undertaken/involved to be recorded.
5. The log book has to be countersigned by the concerned mentor/faculty in charge.
6. Evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
7. The final evaluation to be reflected in the grade memo of the student.
8. The Community Service Project should be different from the regular programmes of NSS/NCC/Green Corps/Red Ribbon Club, etc.
9. Minor project report should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.
10. Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training

Role of Students:

- ✓ Students may not have the expertise to conduct all the programmes on their own. The students then can play a facilitator role.
- ✓ For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
- ✓ As and when required the College faculty themselves act as Resource Persons.
- ✓ Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
- ✓ And also, with the Governmental Departments. If the programme is rolled out, the District Administration could be roped in for the successful deployment of the programme.
- ✓ An in-house training and induction programme could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Assessment Model

1. There shall only be Internal Evaluation.
2. The faculty guide assigned is in charge of the learning activities of the students and for the comprehensive and continuous assessment of the students
3. The assessment is to be conducted for 100 Marks

4. The number of credits assigned is 4, later the marks shall be converted into grades and grade points include finally in the SGPA and CGPA
5. The weightage shall be

Activity log	20 Marks
Community service project implementation	30 Marks
Mini project work	25 Marks
Oral Presentation	25 Marks

6. Activity log is the record of the day to day activities. The activity log is assessed on an individual basis, thus allowing for individual members with in groups to be assessed this way. The assessment will take into consideration the individual students' involvement in the assigned work.
7. While evaluating the student's activity log the following shall be considered
    a. The individual student's effort and commitment
    b. The originality and quality of the work produced by the individual student
    c. The student's integration and cooperation with the work assigned
    d. The completeness of the activity log
8. The assessment for the community service project implementation shall include the following components and based on weekly projects and Outcomes Description
    a. Details of the Socio-Economic Survey of the village/habitation.
    b. Problems identified.
    c. Community Awareness Programs organized.
    d. Suggested Short-Term and Long-Term Action Plan.

Sample Evaluation Form for CSP

Evaluation by the Person in-charge in the Community / Habitation

Student Name:

Registration No:

Period of CSP: From: To:

Date of Evaluation:

Name of the Person in-charge:
Address with mobile number:

Please rate the student's performance in the following areas:

Please note that your evaluation shall be done independent of the Student's self-evaluation

Rating Scale: 1 is lowest and 5 is highest rank

1	Oral communication	1	2	3	4	5
2	Written communication	1	2	3	4	5
3	Proactiveness	1	2	3	4	5
4	Interaction ability with community	1	2	3	4	5
5	Positive Attitude	1	2	3	4	5
6	Self-confidence	1	2	3	4	5
7	Ability to learn	1	2	3	4	5
8	Work Plan and organization	1	2	3	4	5
9	Professionalism	1	2	3	4	5
10	Creativity	1	2	3	4	5
11	Quality of work done	1	2	3	4	5
12	Time Management	1	2	3	4	5
13	Understanding the Community	1	2	3	4	5
14	Achievement of Desired Outcomes	1	2	3	4	5
15	**OVERALL PERFORMANCE**	**1**	**2**	**3**	**4**	**5**

Date: **Signature of the Supervisor**

Indirect Method

The indirect assessment for course outcome is done by the Semester End Course Feedback taken at the end of each course from the students. For each CO, there will be three options with weightage namely GOOD (3), AVERAGE (2) AND POOR (1), out of which the student has to select one option.

Sl. No.	Method	Frequency
1	Course End Feedback	Per course at the end of each semester

157	148					
158	149	3				
159	150	1	1	1	1	1
160	Class Average	2.00	1.00	1.00	1.00	1.00
161	Student Scored above average mark	1	1	1	1	1
162	Students attempted the question	2	1	1	1	1
163	% students scored above average mark	50.00	100	100	100	100
164	Attainment level	1	3	3	3	3
165						
166						

	Rubrics:	
167		
168	>80% students	3
169	80 to 55% students	2
170	<55 % students	1

171
172

CO ATTAINMENT PROCESS

Course Outcomes (CO) Direct Attainment Level

S. No.	Threshold level (%)	Attainment level Criteria	Attainment level
1	50% of Maximum Marks	More than 80% of students scoring more than class average	3
		56 to 79% of students scoring more than class average	2
		At least 55% of students scoring more than class average	1

University Result grading system

Marks Range Theory (Max – 100)	Marks Range Lab (Max – 50)	Level	Letter Grade	GradePoint
≥ 90	≥ 45	Outstanding	A+	10
≥80 to <90	≥40 to <45	Excellent	A	9
≥70 to <80	≥35 to <40	Very Good	B	8
≥60 to <70	≥30 to <35	Good	C	7
≥50 to <60	≥25 to <30	Fair	D	6
≥40 to <50	≥20 to <25	Satisfactory	E	5
<40	<20	Fail	F	0
-		Absent	AB	0

Course Outcome Attainment

Computation of CO Direct Attainment in the course

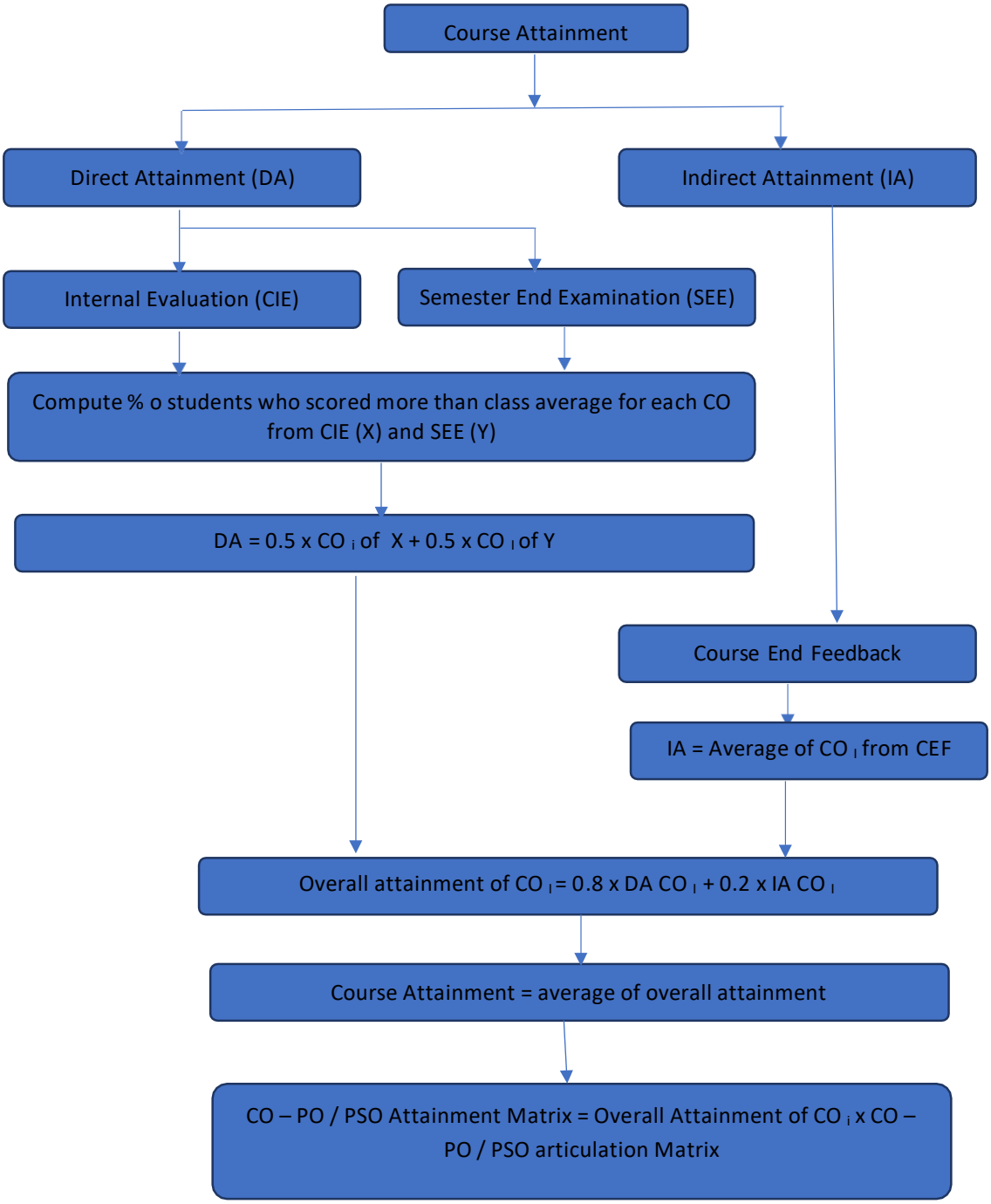
Direct CO Attainment = 50% of CIE Attainment Level + 50% of SEE Attainment Level

Computation of CO Indirect Attainment in the course

Indirect Attainment Average value of each CO

OVERALL CO Attainment in the course:

Computation of Attainment of COs in the course = 80% of Direct CO Attainment+ 20% of Indirect CO Attainment


Course Attainment
Direct Attainment (DA)
Indirect Attainment (IA)
Internal Evaluation (CIE)
Semester End Examination (SEE)
Compute % o students who scored more than class average for each CO from CIE (X) and SEE (Y)
DA = 0.5 x CO i of X + 0.5 x CO i of Y
Course End Feedback
IA = Average of CO i from CEF
Overall attainment of CO i = 0.8 x DA CO i + 0.2 x IA CO i
Course Attainment = average of overall attainment
CO – PO / PSO Attainment Matrix = Overall Attainment of CO i x CO – PO / PSO articulation Matrix

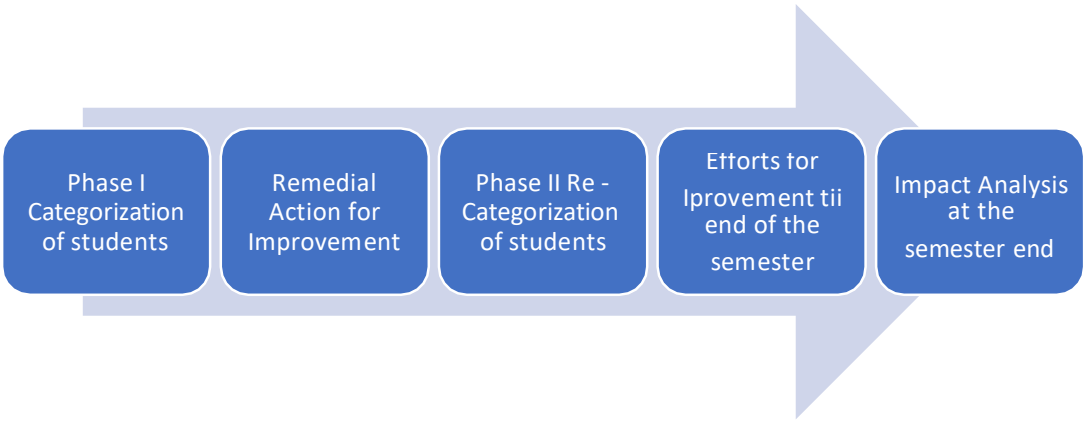
S.No	Internal Examination-1										Internal Examination-2										Internal	End Semester grade	Grade Point
	1(A)	1(B)	2(A)	2(B)	3(A)	3(B)	Total	Assign.	Quiz	Total	1(A)	1(B)	2(A)	2(B)	3(A)	3(B)	Total	Assign.	Quiz	Total			
Maximum Marks	2	3	2	3	3	2	15	5	10	30	2	3	2	3	2	3	15	5	10	30	30	A+	10
Class Average Mark	0.86	1.01	1.17	1.11	1.17	1.36	3.89	4.22	2.71	10.82	1.75	1.62	1.88	1.70	1.87	1.87	6.20	5.00	5.00	11.20	12.30		3.03
Student Scored above average mark	67	28	31	19	69	47	66	86	80	66	94	19	91	19	72	56	61	132	132	61	67		64
Students attempted the question	108	70	63	44	69	84	132	132	132	132	122	34	101	33	82	77	132	132	132	132	132		132
% students scored above average mark	62.04	40.00	49.21	43.18	100.00	55.95	50.00	65.15	60.61	50.00	77.05	55.88	90.10	57.58	87.80	72.73	46.21	100.00	100.00	46.21	50.76		48.48
Attainment level	2	1	1	1	3	2	1	2	2	1	2	2	3	2	3	2	1	3	3	1	1		1

	Internal	Univ. Exam	CO Attainment from Assessment	CO Attainment from Feedback	Overall CO Attainment
CXXX.1	1.75	1	1.4875	1.93	**1.58**
CXXX.2	1.5	1	1.325	1.99	**1.46**
CXXX.3	2.25	1	1.8125	1.98	**1.85**
CXXX.4	2.5	1	1.975	2.02	**1.98**
CXXX.5	2.75	1	2.1375	1.93	**2.1**
CXXX.6	2.75	1	2.1375	1.98	**2.11**
		Overall Course attainment			**1.85**
		Set target for course attainment			**1.688**
		Status of the course attainment (Yes/No)			Yes

Rubrics:	Level
>80% students	3
80 to 55% students	2
<55 % students	1

STUDENT COMPETENCY

Chart of Action Plan



Guidelines for First Year

Phase I- Categorization (After 20 Days of start of semester)	**Phase II- Re-categorization (After Mid Term Result)**
12th Marks	MID Term I Result
Attendance & Behavior	Timely Completion of Assignment
	Attendance & Behavior
	Previous Semester University Result (Applicable for Sem-II)

Guidelines for Higher Classes

Phase I- Categorization (After 15 Days of start of semester)	**Phase II- Re-categorization (After Mid Term Result)**
Previous semester University Result whichever is available	Mid Term Result
Attendance & Behavior	Timely completion of Assignment work
	Attendance & Behavior
	Previous semester University Result

Base Score for student category

Less than **threshold value*** -Slow Learner

Greater than **threshold value***-Advanced Learner

*Threshold Value – decided by course coordinator

Strategies for Slow and Advanced Learners

For Slow learners

- Document/record of remedial classes with timetable & attendance
- Specially designed assignment/ task
- Student study group for peer to peer learning
- Individual Counseling

Note: Remedial sessions should be conducted once every week.

For Advanced Learners

- Encouraging to present & publish papers in journals/conferences/competitions
- Guidance for GATE/ competitive Examination
- Encouraging to participate in professional activities.
- Specially designed activities to improve the portfolio of students.
- Individual guidance for career building

Note: Activities should be on continuous basis.

Activity Based Learning

Examples:

MOOC, Flipped Classroom, Think Pair Share, Think Pair Solo, Four Corners, Round Robin, Collaborative Learning, Jig-Saw Puzzle, Matrix Method, Peer Learning, Work-Based Learning, Problem-Based Learning, Personalized Learning, Group Discussion, Debate, Case Studies, Fish Bowl, Reciprocal Teaching, etc.

ATTAINMENT OF PROGRAM OUTCOMES (POs) AND PROGRAM SPECIFIC OUTCOMES (PSOs)

For **Direct Attainment** of POs/PSOs course attainment is computed for all the courses that the batch has studied/opted and CO-PO/PSO attainment averages are obtained for all the Courses. The Course-PO/PSO attainment matrix is prepared by arranging the Course-PO/PSO attainment of all the courses in a table. Individual Course-PO/PSO attainments are obtained by taking the average of the respective columns of Course-PO/PSO attainment matrix.

Evaluations of attainment of POs and PSOs based on 80% of Direct Attainment (DA) + 20% of Indirect Attainment (IA) combined to arrive at the Final Evaluation.

Indirect Attainment is computed using the tools including:

- **Student Exit Feedback** is collected from the students of that batch immediately after their graduation.
- **Employer Feedback** is collected from the corporate companies which recruit students in big numbers.
- **Indirect attainment through Co-Curricular activities** is computed through student achievements which include paper presentations, project presentations, coding competitions, participation in seminars / workshops / Guest Lectures / Keynote addresses and internships.
- **Indirect attainment through extracurricular activities** is computed through student achievements which include NSS, College Newsletter, Event coordination, Cultural Activities, Sports.

List of Assessment Tools and Processes

Attainment of POs & PSOs is based on direct assessment tools as well as indirect assessment tools. Direct Assessment of POs & PSOs is based on the student's performance in both internal examinations and University Examinations for all courses.

Performance of the students in different assessments such as internal examinations and University examinations lead to attainment of COs and they in turn leads to attainment of POs & PSOs based on the mappings of CO-PO/PSO.

To evaluate the attainment of POs/PSOs the following tools are used.

- Direct Assessment Tools
    - Internal Examinations
        - Theory Courses

- Lab Courses
- Seminar
- Project

- University Examinations
  - Theory Courses
  - Lab Courses
  - Project

- Indirect Assessment Tools
  - Student Exit Feedback
  - Alumni Feedback
  - Employer Feedback

Quality and Relevance of Assessment Tools and Processes

The Programme Assessment and Quality Improvement Committee (PAQIC) decided to have the following PO Assessment methods for various POs, depending on the number of courses contributing to each PO.

PO Attainment having more than 50% courses contributed to PO / PSO

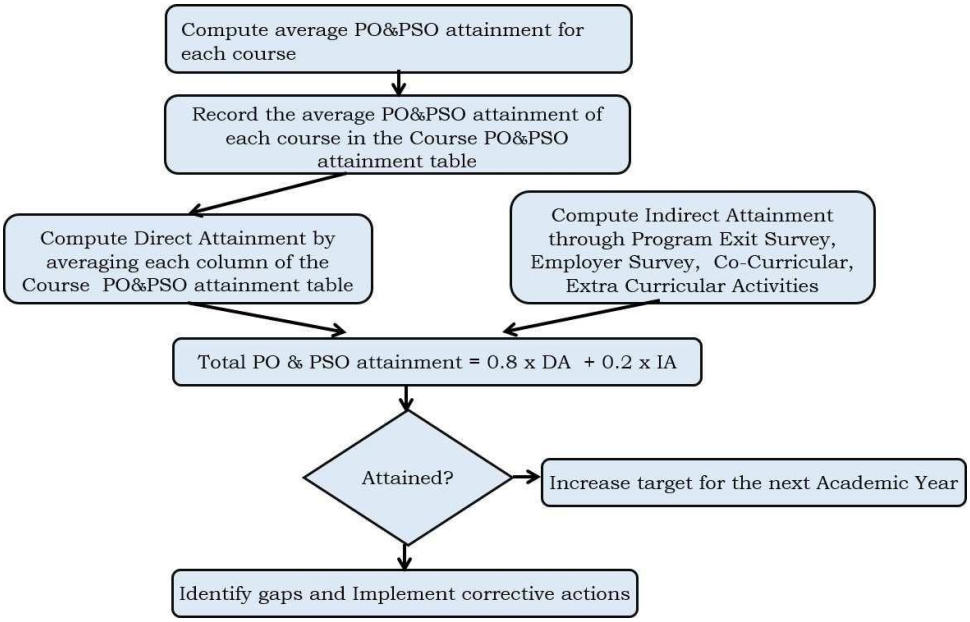
1	Assessment of COs & their contribution to PO Attainment	80 %
2	Indirect Assessment (Students Exit Feedback, Alumni Feedback, Employer Feedback)	20 %

PO Attainment having less than 50% courses contributed to PO / PSO

1	Assessment of COs & their contribution to PO Attainment	60%
3	Students Exit Feedback	20 %
2	Alumni Feedback	
3	Employer Feedback	
4	Assessment of student participation in Co/Extra-curricular Activities & contribution to PO Attainment	20%

Rubrics for student participation in Co / Extra-Curricular activities for attainment of PO / PSO

S. No	Activity	Low (1)	Medium (2)	High (3)	Relevance to POs and PSOs	Activities conducte	Assessment
1.	Guest Lectures (Co-	1 Guest Lectures organized	2 Guest Lectures organized	>= 3 Guest Lectures organized	PO1, PO5, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2	1	1
2.	Add-on courses /Summer internships	Nil	1 program organized	More than 2 programs organized	PO7, PO9, PO10, PO12, PSO1	2	2
3.	NSS Activitie	Less than 25	26-50 student's	Above 50 student's	PO6, PO7, PO8, PO9, PO12	50% student's	3
4.	Programs on Entrepreneurship	Nil	1 program organized	More than 2 programs organized	PO9, PO12	4	3
5.	Job/Skill Oriented Programs	1-10 Programs	11-20 Programs	More Than 20 Programs	PO9, PO10, PO12	8	2
6.	Students participat	1-25 students	26-50 students	More than 50	PO6, PO7, PO9	25%	1
7.	Students internshi	Less than	1-10	More than	PO7, PO9, PO10, PO11, PSO1, PSO2	6	2
8.	Workshop	1 Workshop	03	More than 5	PO8, PO10, PSO1, PSO2	1	1


Compute average PO&PSO attainment for each course
Record the average PO&PSO attainment of each course in the Course PO&PSO attainment table
Compute Direct Attainment by averaging each column of the Course PO&PSO attainment table
Compute Indirect Attainment through Program Exit Survey, Employer Survey, Co-Curricular, Extra Curricular Activities
Total PO & PSO attainment = 0.8 x DA + 0.2 x IA
Attained?
Increase target for the next Academic Year
Identify gaps and Implement corrective actions

CONTINUOUS IMPROVEMENT

Contribution of CO in PO attainment and Continuous Improvement (Faculty Level)

Outcome	Action to be taken by faculty
High attainment of all CO-PO (>2.5 out of 3)	Set new higher targets or attainment levels for next Academic Year (AY)
Moderate attainment of all CO-PO (1.8 to 2.49 out of 3)	Record observations, Continue action plan of lastA.Y. with plan for improvements.
Low attainment of all CO – PO (0.9 to 1.79 out of 3)	Record observations, assess the target set, revise/improve action plan of last A.Y. to achieve the attainment with plan for improvements.
CO-PO not attained, poor performance (<0.9 out of 3)	Record observations, Critical assessment of target with Program Assessment and Quality Improvement Committee (PAQIC), Revise action plan of last A.Y. at faculty/department level.

PO attainment and Continuous Improvement (PC and HoD Level)

Category	Outcome	Action by PC and HoD
Course Related	PO attained highly	Include activities with HOT.
	PO not attained highly	Identify concerned courses, plan for immediate improvements, guide, support and monitor its execution.
Activity Related	Activities Conducted	Critical assessment, impact analysis to be done and revise as per the need for improvements.