

1. Preamble

Outcome-Based Education (OBE) is an educational model that forms the base of a quality educational 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 focus 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.

1.1 OBE Model and Levels of Outcomes:

The OBE model measures the progress of the graduate in four parameters, which are

1. *Program Educational Objectives (PEO)*
2. *Program Specific Outcomes (PSO)*
3. *Program Outcomes (PO)*
4. *Course Outcomes (CO)*



Figure 1: OBE Model and Levels of Outcomes

1.2 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 student's 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 students to feel responsible for their own learning, and they should learn more through this individual learning.

1.3 Why OBE?

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

1.4. India, OBE and Accreditations

From **13th June 2014**, India has become the permanent signatory member of the *Washington Accord*. Implementation of OBE in higher technical education also started in India. The *National Assessment and Accreditation Council (NAAC)* and *National Board of Accreditation (NBA)* are the autonomous bodies for promoting global quality standards for technical education in India. NBA has started accrediting only the Programs running with OBE from 2013.

The National Board of Accreditation mandates establishing a culture of outcome based education in institutions that offer Engineering, Pharmacy and Management program. Reports of outcome analysis help to find gaps and carryout continuous improvements in the education system of an Institute, which is very essential.

2. Vision- Mission

Vision of the institute:

"To be one of the nation's premier Institutions for Technical and Management Education and a key contributor for Technological and Socio-economic Development of the Nation"

Mission of the institute:

- **M1:** To produce technically competent Engineers and Managers by maintaining high academic standards, world class infrastructure and core instructions.
- **M2:** To enhance innovative skills and multidisciplinary approach of students through well experienced faculty and industry interactions.
- **M3:** To inculcate global perspective and attitude of students to face real world challenges by developing leadership qualities, lifelong learning abilities and ethical values.

Vision of the Department:

"To be a choice for education in the area of Computer Science and Engineering, serve as a valuable resource for IT industry and society and exhibit creativity, innovation and ethics to cater to the global challenges"

Mission of the department:

- M1:** ✓ To educate learners by adapting innovative pedagogies for enhancing their cognitive skills, technical competence and lifelong learning.
- M2:** ✓ To provide training programs and guidance to learners through industry institute partnerships, social awareness programs, internships, competitions and project works to inculcate research skills to address the global challenges.
- M3:** ✓ To provide opportunities for students to practice professional, social and ethical responsibilities using IT expertise with a blend of leadership and entrepreneurial skills.

3. Programme Educational Objectives (PEOs)

Programme Educational Objectives (PEOs) of B.Tech (Computer Science and Engineering) program are:

After 3 to 5 years of graduation, the students will be able to

- | | |
|----------------|--|
| PEO_1 : | Procure employment/progress towards higher degree and practice successfully in the CS/IT profession. (Successful Career Goals). |
| PEO_2 : | Address complex problems by adapting to rapidly changing IT technologies.(Professional Competency). |
| PEO_3 : | Gain respect and trust of others as effective and ethical team member by demonstrating professionalism and functioning effectively in team-oriented and open-ended activities in industry and society.(Leadership, Ethics and Contribution to Society). |

4. Programme Specific Outcomes (PSOs)

A graduate of the Computer Science and Engineering Program will be able to:

- | | |
|--------------|---|
| PSO 1 | Domain Specific Knowledge: Apply the relevant techniques to develop solutions in the domains of algorithms, system software, computer programming, multimedia, web, data and networking. |
| PSO 2 | Software Product Development: Apply the design and deployment principles to deliver a quality software product for the success of business of varying complexity. |

5. Programme Outcomes (POs)

The Program Outcomes (Pos) Defined By National Board of Accreditation (NBA)

The POs essentially indicate what the students can do from subject-wise knowledge acquired by them during the program. As such, POs define the professional profile of an engineering graduate. NBA has defined the following twelve POs for an engineering graduate. These are in line with the Graduate Attributes as defined by the Washington Accord.

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, an engineering specialization to the solution of complex engineering problems.
- 2. Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- 3. 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.
- 4. 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 for complex problems.
- 5. Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. 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.
- 7. 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.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **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.
12. **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

6. Basic Terminologies

- a. **Assessment**-Assessment is the systematic and ongoing method of gathering, analyzing and using information from measured outcomes to improve student learning.
- b. **Assessment Method** - this term refers to any technique or activity that is used to investigate what students are learning or how well they are learning.
- c. **Assessment Plan** – the proposed methods and timeline for assessment-related activities in a given course (e.g., when are you going to check what/how well the students are learning and how are you going to do that?).
- d. **Course-Level Assessment** – this type of assessment focuses on what students are learning in a certain course within a program. Course-level assessment can focus on either a single section of a course or all sections of the same course. Course-level assessment data can be used as one source of information for program level assessment.
- e. **Program Assessment**-When developing and implementing assessment strategies, academic units should have at least one of three purposes in mind: to improve, to inform, and/or to prove. The results from an assessment process should provide information that can be used to determine whether or not program outcomes are being achieved and how the programs can be improved. An assessment process should also be designed to inform departmental faculty and other decision-makers about relevant issues that can impact the program and student learning.
- f. **Learning Outcome** - what the program faculty intend students to be able to know, do, or think upon completion of a degree program (synonyms for “program outcome” include learning outcome, learning outcome statement, exemplary educational outcomes, and expected learning outcome).
- g. **Direct Assessment Method** - direct measures of student learning require students to display their actual knowledge and skills (rather than report what they think their knowledge and skills are). Examples of direct assessment methods include objective tests, essays, presentations, and classroom assignments.
- h. **Indirect Assessment Method** - indirect assessment asks students to reflect on their learning rather than to demonstrate it. Examples include external reviewers, course end survey, student exit surveys, exit interviews, alumni surveys, employer surveys, etc.

- i. **Formative Assessment** – assessment that occurs during a learning experience. This type of assessment allows faculty and administrators to make adjustments to the learning experience to increase student learning. Examples include midterm exams in the middle of a course, focus groups at the midpoint in a degree program, etc.
- j. **Summative Assessment** – assessment that occurs at the end of a course completion (e.g., a comprehensive exam at the end of a semester etc.).
- k. **Rubric** - a scoring and instruction tool used to assess student performance using a task-specific range or set of criteria. To measure student performance against this pre-determined set of criteria, a rubric contains the essential criteria for the task and levels of performance (i.e., from poor to excellent) for each criterion.
- l. **Target (criterion):** Desired level of student performance on a particular learning outcome, stated explicitly in an assessment report, and set before assessment of course or program learning outcomes is conducted.

6.1 Why Assess?

Assessment can facilitate improvement through variety of venues. When faculty members are directly considering what worked well and what didn't, and involved in the development, implementation, and using those observations and impressions to make analysis of assessment activities, a number of specific changes in your curriculum.

6.2 Who Is Responsible For Assessment?

Assessment is not the sole responsibility of any one faculty member or administrator. The best assessment plans include a variety of professionals from various walks of life. Assessment is the responsibility of the management, faculty, and department. Program-level assessment is the responsibility of all of the faculty, administrators, and university for any given degree program.

6.3. Purposes of program assessment

The *four main* purposes of program assessment are:

- 1. **To improve** – the assessment process should provide feedback to determine how the program can be improved.
- 2. **To inform** – the assessment process should inform faculty and other decision makers of the contributions and impact of the program.

3. **To prove** – the assessment process should encapsulate and demonstrate to students, faculty, staff and outsiders what the program is accomplishing.
4. **To support** – the assessment process should provide support for institute decision-making activities such as program review and strategic planning, as well as external accountability activities such as accreditation.

6.4 What Are The Steps To Effective Program Assessment?

Ultimately, the purpose of program assessment approach to respond to departmental goals and timelines, taking into account internal expectations, external requirements, or both. In general, however, department will complete the following steps to develop an effective program assessment plan: Checklist to better learning:

- ✓ Agree on your mission
- ✓ Create goals for program outcomes and processes
- ✓ Identify related activities for each goal
- ✓ Brainstorm appropriate measures
- ✓ Evaluate and select measures
- ✓ Identify appropriate assessment methods
- ✓ Develop a plan for collecting data
- ✓ Prioritize goals
- ✓ Set timeline, milestones
- ✓ Implement assessment plan
- ✓ Use data to improve processes
- ✓ Communicate results

7. Administrative Setup for Assessment Implementation

7.1 The Administrative System

The administrative system for implementation of Assessment consists of coordinators and committees. There are three committees responsible for effective implementation which helps in ensuring the achievements of the PEOs/POs/PSOs.

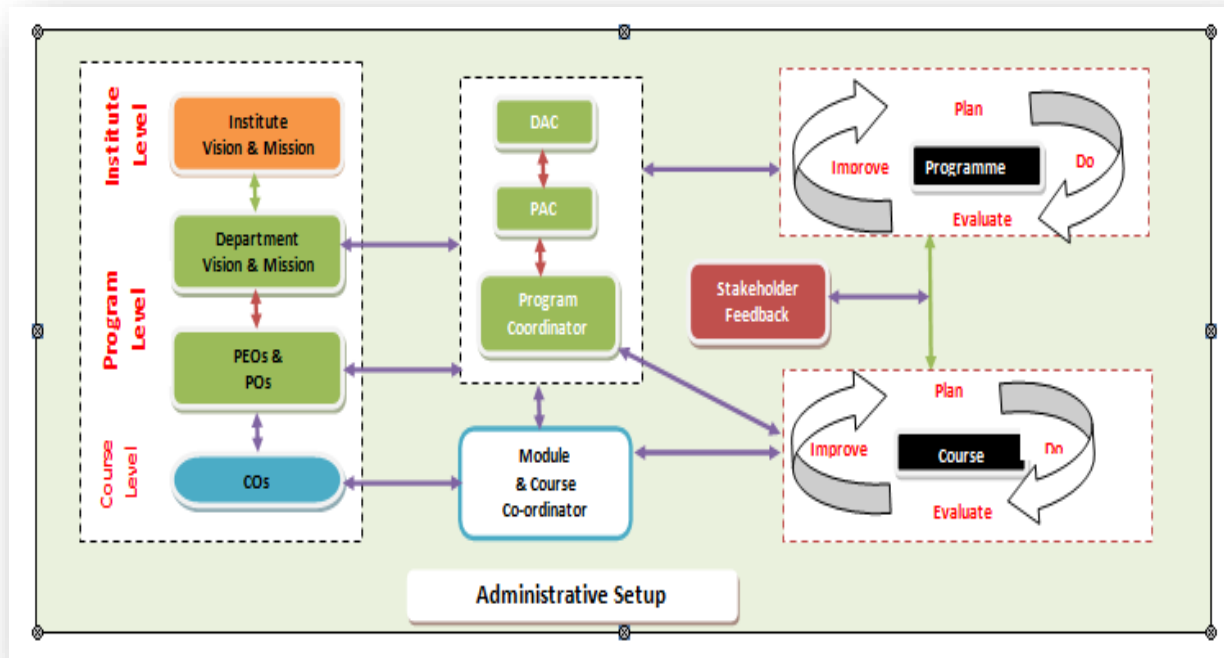


Figure 2: Administrative Setup

7.2 Departmental Advisory Committee (DA_dC)

DA_dC is basic constituent of the academic system
The composition of the DA_dC:

i. **Chairman:** Head of the concerned department

ii. **Members:**

1. HOD - Chairman:

2. External Members – Representatives from

- 1 Industry
- 2 Academician
- 3 Alumni

3. Internal members:

- Four senior faculty members of department
- Two Final year Student (one Male and One Female)

The term of the nominated members shall be two years. Principal shall decide the schedule for meeting of the DA_dC for different departments. The meeting may be scheduled as and when necessary, but at least once a year.

Functions of DA_dC

1. Drafting of Vision, Mission of department
2. Drafting of PEOs, Formulation of POs/PSOs
3. Defines current and future issues related to programme.
4. Develop/recommends new or revised PEOs/PSOs
5. Recommends the proposals/requirements for effective implementation of OBE
6. Define various assessment tools for measuring outcomes
7. Evaluates the attainment of PEOs, POs/PSOs and proposes necessary improvements

7.3 Program Assessment Committee (PAC)

i. *Chair:* Programme Coordinator

ii. *Members:*

1. Module coordinators of domains
2. Course Coordinators

Functions of PAC

1. Articulation of Vision and Mission (Added)
2. Evaluates and monitors the attainment of POs/PSOs
3. Proposes necessary changes for continuous improvements.
4. Preparation of periodic reports on programme related activities, status reports for management and key stakeholders.
5. Faculty motivation: Attend/organize workshop/seminar/FDP, paper publication, development of models/lab.
6. Student motivation: Attend/participate tech competitions, paper presentation, mini Projects/models, social/cultural events, skill development programs.
7. Conduct surveys, interaction with faculty, coordinators and other stakeholders
8. Planning of co-curricular activities for attainment of POs/PSOs

7.3.1 Programme Coordinator:

The duties, responsibilities and regulations of coordinators are as follows:

1. Schedules programme work in accordance with PEOs and POs/PSOs.
2. Oversees daily operations and coordinate activities of programme interrelated with activities of other programmes to ensure optimum efficiency and compliance with appropriate policies and specifications given by HOD.
3. Monitor and reviews activities of each year in the programme independently with course coordinators.
4. Interacts with key stake holders, students, faculty, HOD and employers.
5. Conduct and interprets various surveys require to assess PEOs and POs/PSOs.

7.4 Module Committee (MC)

i. **Chair:** Module Coordinator

ii. **Members:** Course coordinators

Functions of Module Committee

1. Formation of COs
2. Formulation of curriculum gap and content beyond syllabi
3. Semester planning for course delivery, design contest, workshop, expert lectures, site visits, mini projects
4. Evaluates and monitors the attainment of COs.
5. Proposes necessary changes for continuous improvements.
6. Preparation of periodic reports on course related activities, status reports for management and key stakeholders.
7. Student motivation: Attend/participate tech competitions, paper presentation, mini Projects/models, social/cultural events, skill development programs.

7.4.1 Module Coordinator:

The duties, responsibilities and regulations of coordinators are as follows:

1. Coordinate and supervise the faculty teaching the courses in the module
2. Assessment of COs.

3. Recommend and facilitates workshop/guest lectures/seminar/FDP to meet the COs.
4. Analyse the attainment of COs of a particular course and recommends programme coordinator to take appropriate action for improvements.
5. Interact with students, faculty, Programme Coordinator and Head of Department to determine priorities and policies for improvements.

7.4.2 Course Coordinator:

The duties, responsibilities and regulations of coordinators are as follows:

1. Plan, implement, monitor and review and Course Outcomes (COs).
2. Evaluation of COs.
3. Suggest improvements based on attainment of COs.

8. Blooms Taxonomy

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. The stages ascend in complexity and what they demand of students. First students need to simply remember information provided to them — but reciting something doesn't demonstrate having learned it, only memorization. With understanding comes the ability to explain the ideas and concepts to others. The students are then challenged to apply the information and use it in new ways, helping to gain a deeper understanding of previously covered material and demonstrating it moving forward. Questioning information is a vital part of learning, and both analysis and evaluation do just this. Analyzing asks a student to examine the information in a new way, and evaluation demands the student appraise the material in a way that lets them defend or argue against it as they determine. The final step in the revised taxonomy is creating, which entails a developing new product or point of view. How does this learned information impact your world? How can it be used to impact not just your education but the way you interact with your surroundings? By utilizing Bloom's Taxonomy, students are not going to forget the information as soon as the class ends - rather, they retain and apply

the information as they continue to grow as a student and in their careers, staying one step ahead of the competition.

Incorporating Critical Thinking Skills into Course Outcome Statements Many faculty members choose to incorporate words that reflect critical or higher-order thinking into their learning outcome statements. Bloom (1956) developed a taxonomy outlining the different types of thinking skills people use in the learning process. Bloom argued that people use different levels of thinking skills to process different types of information and situations. Some of these are basic cognitive skills (such as memorization) while others are complex skills (such as creating new ways to apply information). These skills are often referred to as critical thinking skills or higher-order thinking skills.

The blooms taxonomy is shown in figure where the lower levels become foundation for the higher levels. The Bloom's taxonomy process is ordered in such a way that the lowest level is the simplest form of recognition, while the highest level built on lower levels involves more complex form of cognitive skill. By providing a hierarchy of levels, this taxonomy can assist teachers in designing assessment framework to measure the student's learning ability and making teaching method, innovative and adaptive to student's competencies and enhancing the same.

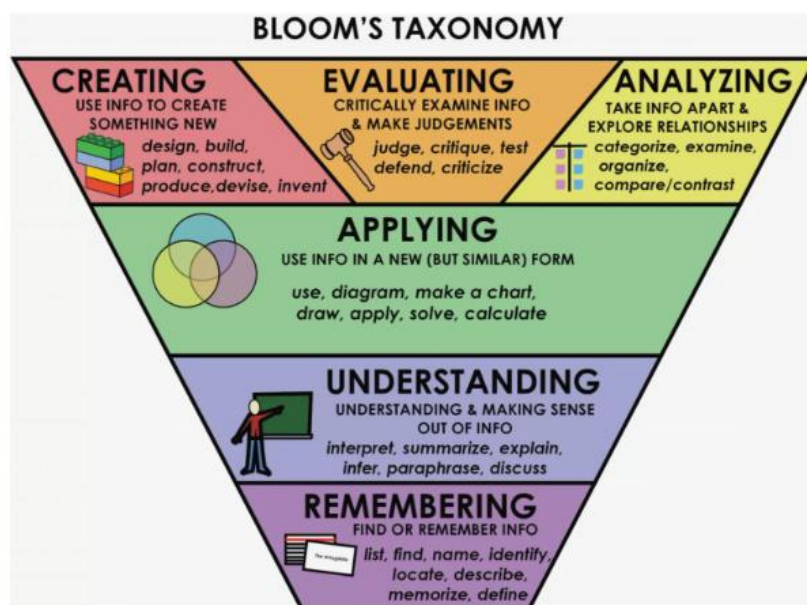


Figure 3: Blooms Taxonomy

Bloom's Taxonomy

Categories, Overview, Explanation & Action Verbs

Remember: Action verbs are not just words to plug in to complete an exercise. They help shape your thinking about how best to promote learning in your courses.

Categories (Levels of thinking)	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
Overview	Recall facts and basic concepts	Explain ideas or concepts	Use information in new situations	Draw connections among ideas	Justify a stand or decision	Produce new or original work
Explanation	Demonstrate memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems in new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Action Verbs	<ul style="list-style-type: none"> • Choose • Define • Enumerate/Number • Find • Group • identify • Label • List • Locate • Match • Name • Recall • Recognize • Reproduce • Select • Sort • State 	<ul style="list-style-type: none"> • Annotate • Classify • Compare • Contrast • Describe • Differentiate • Exemplify • Explain • Convert • Discuss • Generalize • Give examples of • Illustrate • Indicate • Infer • Interpret • Map • Organize • Outline • Paraphrase • Picture graphically • Relate • Rephrase/Restate • Select • Show • Summarize • Translate 	<ul style="list-style-type: none"> • Adapt • Advise • Apply • Build • Change • Choose • Compute • Construct • Customize • Demonstrate • Dramatize • Employ • Implement • Interpret • Manipulate • Model • Modify • Operate • Organize • Personalize • Plan • Prepare • Select • Simulate • Solve • Use/Utilize 	<ul style="list-style-type: none"> • Analyze • Categorize • Classify • Compare • Contrast • Detect • Diagnose • Diagram • Differentiate • Dissect • Distinguish • Examine • Infer • Relate • Separate • Simplify • Survey • Test for • Trace 	<ul style="list-style-type: none"> • Appraise • Argue • Assess • Choose • Compare & contrast • Conclude • Critique • Debate • Decide • Deduce • Defend • Determine • Diagnose • Disprove • Estimate • Evaluate • Forecast • Interpret • Judge • Justify • Measure • Predict • Prescribe • Prioritize • Rank • Rate • Recommend • Rule on • Score • Support • Test • Validate • Verify 	<ul style="list-style-type: none"> • Adapt • Build • Change • Combine • Compile • Compose • Construct • Create • Design • Develop • Discover • Expand • Formulate • Generate • Improve • Invent • Integrate • Make up • Manage • Modify • Organize • Plan • Prepare • Produce • Propose • Reconstruct • Revise • Role play • Synthesize

Figure 4: Blooms Action Verbs

9. Course Outcomes

A Course Outcome is a formal statement of what students are expected to learn in a course. When creating Course Outcomes remember that the outcomes should clearly state what students will do or produce to determine and/or demonstrate their learning. Course learning outcome statements refer to specific knowledge, practical skills, areas of professional development, attitudes, higher-order thinking skills, etc. that faculty members expect students to develop, learn, or master during a course.

A well-formulated set of Course Outcomes will describe what a faculty member hopes to successfully accomplish in offering their particular course(s). The learning outcomes need to be concise descriptions of what learning is expected to prospective students, or what specific skills, take place by course completion, competencies, and knowledge the faculty member believes that students will have attained once the course is completed.

9.1 Developing Course Outcomes

When creating course outcomes consider the following guidelines as you develop them either individually or as part of a multi-section group:

- Limit the course outcomes to 3-5 statements for the entire course [more detailed outcomes can be developed for individual units, assignments, chapters, etc. if the instructor(s) wish (es)].
- Focus on overarching knowledge and/or skills rather than small or trivial details
- Focus on knowledge and skills that are central to the course topic and/or discipline.
- Create statements that have a student focus rather than an instructor centric approach
- Incorporate and/or reflect the institutional and departmental missions.
- Include various ways for students to show success (outlining, describing, modelling, depicting, etc.) rather than using a single statement such as "at the end of the course, students will know " as the stem for each expected outcome statement. When developing learning outcomes, here are the core questions to ask yourself:
 - *What do we want students in the course to learn.?*
 - *What do we want the students to be able to do?*
 - *Are the outcomes observable, measurable and are they able to be performed by the students?*

9.2 Guidelines for writing Course Outcome Statements

Well-written course outcomes involve the following parts:

1. Action verb
2. Learning statement-Subject content

Students are able to

- 1) Design column splices and bases action verb (underline)
- 2) Determine the losses in a flow system (action verb) Subject content

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

Specific	<ul style="list-style-type: none"> o Is there a description of precise behavior and the situation it will be performed in? o Is it concrete, detailed, focused and defined?
Measurable	<ul style="list-style-type: none"> o Can the performance of the outcome be observed and measured?
Achievable	<ul style="list-style-type: none"> o With a reasonable amount of efforts and application can the outcome be achieved? o Are you attempting too much?
Relevant	<ul style="list-style-type: none"> o Is the outcome important or worthwhile to the learner or stakeholder? o Is it possible to achieve this outcome?
Time-Bound	<ul style="list-style-type: none"> o Is there a time limit, rate number, percentage or frequency clearly stated? o When will this outcome be accomplished?

Note: If Laboratory is given as separate course (with course code) then there should be separate course outcomes for Laboratory.

9.3. Quality of Course Outcome

Process at department level to maintain quality of CO

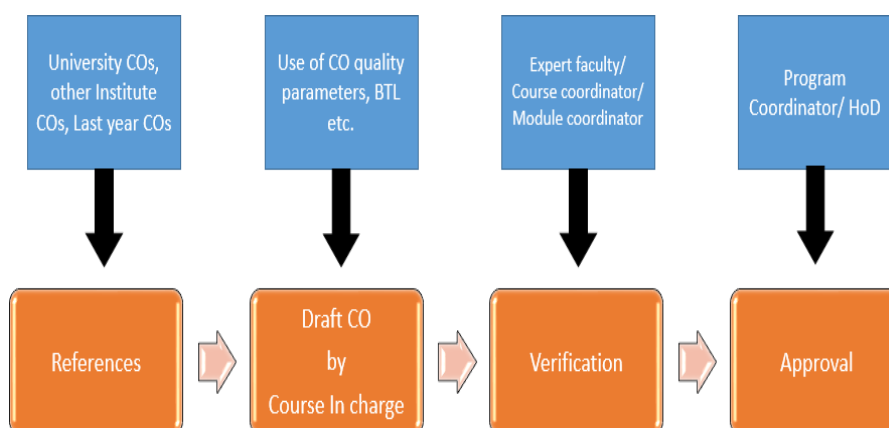


Figure 5: CO Quality Process

9.3.1 Guidelines/Checklist for Cos:

Number of Cos	(3-5)
CO essentials	Action Verb, Subject Content, Level of Achievement, Modes of Performing task (If Applicable)
Based on BTL	Understand, Remember, Apply, Analyse, Evaluate, Create
Number of BTL Considered in one course	Minimum 3
Technical Content/ point of curriculum?	All curriculum contents are covered

9.3.2 CO – PO and CO – PSO mapping of courses

All the courses in the curriculum must cover all the POs (and PSOs). For a course, we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix in Course Information Sheet (CIS). The various correlation levels are:

- “1” – Slight (Low) Correlation
- “2” – Moderate (Medium) Correlation
- “3” – Substantial (High) Correlation

10.CO-PO Mapping Guidelines

- Each CO can be identified to address a subset of POs.
- Based on the number of Cos and the sessions dedicated to them it is possible to identify the strength of mapping to POs.
- Each CO is divided into number of sessions. The sessions are mapped to corresponding POs and PSOs. Like-wise it is done for all COs. The number of hours devoted to the COs will address the given PO.
- Strength of mapping is defined at three levels: Slight or Low (level 1), Moderate or Medium (level 2) and Substantial or high (level 3)

Level	Sessions in Percentage
Low (1)	< 25
Medium (2)	>=25 < 50
High (3)	>=50

Level 1- 1-24 Level 2- 25-49 Level 3->=50

- Based on these strengths of selected Pos a CO matrix can be established
For ex:

COs	Sessions/ Hours Dedicated	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	10	7	3	6	6									6	6
CO1-PO Mapping %		70.00	30.00	60.0	60.0									60.0	60.0
Mapping Level		3	2	3	3									3	3
CO2	11	6	9	7	4									7	6
CO2-PO Mapping %		54.5	81.8	63.6	36.4									63.3	54.5
Mapping Level		3	3	3	2									3	3
CO3	9	5	4	5	3									5	6
CO3-PO Mapping %		55.6	44.4	55.6	33.3									55.6	66.7
Mapping Level		3	2	3	2									3	3
CO4	9	6	4	5	3									5	6
CO4-PO Mapping %		66.7	44.4	55.6	33.3									55.6	66.7
Mapping Level		3	2	3	2									3	3
CO5	10	6	3	6	5									6	6
CO5-PO Mapping %		60.0	30.0	60.0	50.0									60	60
Mapping Level		3	2	3	3									3	3

Level 1- 1<=24 Level 2- 25<=49 Level 3->=50

10.1 List of Assessment Processes:

- COs are formulated for each course in the curriculum by respective course coordinator/Senior faculty.
- To evaluate the attainment of COs, the data is gathered from the following assessments.
 1. *Student's performance in midterm examinations.*
 2. *Student's performance in the Semester End Examinations (SEE) examinations.*
 3. *Student's feedback on rubrics of each CO of the corresponding course.*
- To assess the course outcomes, direct assessment tools and indirect assessment tools are used.

10.1.1 Direct Assessment Tools: The assessment tools for computing the course outcomes are explained below.

The academic performance of a student in each semester shall be evaluated course wise using Continuous Internal Evaluation (CIE) and Semester End Examination (SEE).

1. Continuous Internal Evaluation (CIE) : The performance of the student in each course is evaluated by the faculty all through the semester; with midterm examinations, assignment test, Term-work, project reviews, viva-voce, laboratory assessment and other means covering the entire syllabus of the course.

2. Semester End Examination (SEE): It shall be conducted by Controller of Examinations at the end of each semester, as per the academic calendar and with a written examination for theory courses and practical/project examination for laboratory/project

a. Theory Courses:

The syllabus for theory courses shall be divided into modules and each module is given equal weight-age in terms of distribution of marks. Each course shall be evaluated for a maximum of 100 marks. The distribution of marks shall be 40 marks for Continuous Internal Evaluation (CIE) and 60 marks for Semester End Examination (SEE).

The distribution of 40 marks allotted for CIE is as given below:

Name of the Test	Marks
Mid Term Examinations	20
Assignment Tests	10
Term Work	10

b. Laboratory Courses: The continuous assessment is carried out in the Day-to-Day evaluation of student performance in the laboratories with respect to the conduct of various experiments along with End semester

laboratory examinations. Laboratory courses shall be evaluated for a maximum of 100 marks. There shall be a Continuous Internal Evaluation (CIE) for 40 marks and 60 marks for Semester end examination (SEE).

- c. **Value Added Courses (VAC)/Certificate Courses (CC):** The Students may undergo VAC/CC apart from the courses/syllabus mentioned in the curriculum and the credits earned through these VAC/CC shall be prescribed in the curriculum for the award of the degree. The VAC/CC carry 100 marks (40 CIE and 60 Final evaluation).
- d. **Career competency Development (CCD):** The Career Competency Development(CCD) is designed as a Skill Oriented Course and is offered to acquire skills required for placements. This includes Aptitude, Verbal Reasoning, Logical Reasoning, Group Discussion, Oral and Written Communication Skills, Presentation skills, Technical skills etc.
- e. **Summer Internship/On the Job Training:** The internship can be done by the students at local industries, Govt. Organizations, Research organization/college, construction agencies etc. Evaluation of the summer internships shall be through the departmental committee.
- f. **Project Work, Seminar and Internship:** In the final semester, the student should undergo internship and parallel he/she should work on a project. The Project work, seminar and Internship are evaluated by departmental committee at regular intervals given by each student on the topic of his project work during the course work of the semester. The project committee members follow the rubrics for internal continuous evaluation of the project work. The End Semester Examination (Viva-voce) shall be conducted by a committee. Project work, seminar and Internship shall be evaluated for a maximum of 200 marks. There shall be continuous internal evaluation for 60 marks and semester end examination for 140 marks .
- g. **Community Service Project :** Community Service Project should be an integral part of the curriculum, as an alternative to the 4 weeks of Summer Internships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships/ On the Job Training.
- h. **Mandatory course:** These are non-credited courses that are required to be completed to fulfill the degree requirements. There shall be no external examination. However, attendance in the audit course shall be considered while calculating aggregate attendance.
- i. **Activity Point Programme (APP):** Every regular student, who is admitted to the B.Tech Degree programme, is required to earn 80 Activity Points in addition to the required academic grades, for getting 4 Years degree programme.

Distribution of Direct Assessment Components

Course Type	Assessment Methods	Weightage
Theory courses	CIE	40
	SEE	60
Laboratory Courses	CIE	40
	SEE	60
Value Added Courses (VAC)/ Certificate Courses (CC)	CIE	40
	SEE	60
Career competency Development (CCD)	CIE	40
	SEE	60
Summer Internship/On the Job Training	SEE	100
Project Work, Seminar and Internship	CIE	60
	SEE	140

10.1.2. Indirect Assessment Tool:

Course End Survey: At the end-of-course, the student will be given the feedback on the course outcomes to improve the quality of the teaching process of the course. The survey is designed to examine the attainment of Course Outcomes for the given rubrics of the course.

10.1.3. The quality/ Relevance of Assessment processes and Tools used:

- The following tools are used to evaluate the attainment of COs:

1. Direct Assessment tools:

a. CIE

- i. Theory Courses
- ii. Laboratory Courses
- iii. VAC/CC
- iv. CCD
- v. Project Work, Seminar and Internship
- vi. Community Service Project
- vii. Mandatory course
- viii. Activity Point Programme

b. SEE

- i. Theory courses
- ii. Laboratory Courses
- iii. VAC / CC
- iv. CCD
- v. Summer Internship/On the Job Training
- vi. Project Work, Seminar and Internship

2. Indirect Assessment Tools:

- a. Course End Survey.

List of assessment tools used for CO attainment

S. No	Name of the Assessment Tool		Weight-age
1	Direct Assessment Tools	Mid semester examinations	70%
		End semester examinations	
		Term-work	
2	Indirect Assessment Tools	Course End Survey	30%

10.2 Course Outcome Attainment:

Evaluation of CIE and SEE examination marks for setting Course attainment levels for all courses.

Evaluation of marks from both internal and external examinations

Academic Year	Semesters	CIE	SEE	Total marks
	Odd Semester	40	60	100
	Even Semester	40	60	100

Step 1: Direct Assessment

Measurement of Course attainment levels for Internal Examinations:

- Attainment **Level 1**:
If the percentage of course outcome attainment is **less than 70%**
- Attainment **Level 2**:
If the percentage of course outcome attainment is in **between** 70% to 79.99% (inclusive)
- Attainment **Level 3**:
If the percentage of course outcome attainment is **above** 80 % (inclusive)

Measurement of Course attainment levels for SEE Examinations:

- ❖ Attainment **Level 1**:
If the percentage of course outcome attainment is less than 70%
- ❖ Attainment **Level 2**:
If the percentage of course outcome attainment is in between 70% to 79.99% (inclusive)
- ❖ Attainment **Level 3**:
If the percentage of course outcome attainment is above 80% (inclusive)

Overall Direct Assessment including Internal and SEE Examinations:

- Weightage to SEE Examinations: 60%
- Weightage to Term-Work : 10%
- Weightage to Internal Examinations: 30%

Step 2: Indirect Assessment:

Tools: Course End Survey

Process: Collect the feedback and calculate the weighted average as mentioned below

$$= \frac{\text{No.of Highs} \times 3 + \text{No.of Moderates} \times 2 + \text{No.of Lows} \times 1}{\text{No.of students}}$$

Step 3: Overall Course outcome Attainment including direct and Indirect Survey:

Attainment of Course outcomes = 70% of Direct Assessment + 30% of Indirect Assessment.

10.2.1 Step by step procedure for the Attainment of Course Outcome (CO)

1. Write the COs based on the syllabus.
2. Map COs to POs/PSOs based on the level in which particular CO is addressing PO/PSO(High – 3, Moderate – 2, Low -1)

Direct Attainment Tools- internal exams & SEE exams

A. Internal Exam:

1. List out the question wise marks of all the students in the CIE.

S.No	Roll No.	MID 1								MID 2									
		Q1	Q2	Q3	Q4	Q5	Q6	A1	A2	Q1	Q2	Q3	Q4	Q5	Q6	A3	A4	A5	TW

2. Eligibility is 70% of total marks i.e. 7 Marks (in case of total marks for each question – 10 Marks)

- Note the number of students who scored $\geq 70\%$ marks in each question.
- For each question, compute the total marks of the students who scored $\geq 70\%$ in that question

$$\left\{ \begin{array}{l} \text{Compute \% of attainment of CIE} \\ \text{marks for each question} \end{array} \right\} = \frac{\text{Total marks}(\geq 70\%)}{\text{No. of students attempted that question}} \times 100$$

- Convert % into 3-point scale.

$$\begin{array}{ll} \geq 80\% & -3 \\ \geq 70\% & -2 \\ < 70\% & -1 \end{array}$$

- Compute the average attainment of each CO in Internal exam by considering all questions. This gives the CO direct attainment for internal marks in terms of percentage.

A. External Exam

- Calculate SEE marks of students , eligibility: 40% of total marks i.e. 5 Marks

S.No	Roll no.	Questions									
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
SEE Questions											
Max. Marks		12	12	12	12	12	12	12	12	12	12
40	% Marks	5	5	5	5	5	5	5	5	5	5
1	20711A0501	8			12	12			12		12
2	20711A0502	8			12	12			12		12
3	20711A0503	6		5			9		8	12	
4	20711A0504	12		8			11		12	10	
5	20711A0506	9			12		11		12	12	
....

- Compute the total marks of the students who scored $\geq 40\%$ marks
- Compute % of attainment for SEE marks =

$$\left\{ \begin{array}{l} \text{Compute \% of attainment of SEE} \\ \text{marks for each question} \end{array} \right\} = \frac{\text{Total marks}(\geq 40\%)}{\text{No. of students attempted that question}} \times 100$$

- Convert the SEE marks attainment % into 3-point scale:

$$\begin{array}{ll} \geq 80\% & -3 \\ \geq 70\% & -2 \\ < 70\% & -1 \end{array}$$

1.Map each mid question to each CO and take the attainment in 3-point scale

NARAYANA ENGINEERING COLLEGE(A) :: NELLORE																			
Course Attainment Tool (CAT)																			
S.No	Roll no.	MID 1						MID 2											
		MIQ1 PART-A	MIQ2 PART-B	MIQ3 PART-A	MIQ4 PART-B	MIQ5 PART-A	MIQ6 PART-B	A1	A2	M2Q1 PART-A	M2Q2 PART-B	M2Q3 PART-A	M2Q4 PART-B	M2Q5 PART-A	M2Q6 PART-B	A3	A4	A5	TERM WORK
MID Questions		12	12	12	12	12	12	10	10	12	12	12	12	12	12	12	10	10	10
Max. Marks		12	12	12	12	12	12	10	10	12	12	12	12	12	12	12	10	10	10
70 % Marks		8	8	8	8	8	8	7	7	8	8	8	8	8	8	7	7	7	7
1	20711A0501		11		12	11		10	10	11		11		11		10	10	10	9
2	20711A0502	9			9	7		9		9	8		4		10	10	10	7	
3	20711A0503		12	11			11	6		11		11		11		9	9	9	7
4	20711A0504		11	11			11	7	9	10		10		10		9	10	8	8
5	20711A0506		12	11			12	9	10	11		12		11		10		10	9
...	...																		
199	21715A0516		11	10		10		9		11		11		10		9	10	10	9
200	21715A0517		12	11			11	9		10		11		11		10	10	10	10
201	21715A0518		11	11			11			8		11		10		10	9	10	9
Number of students		34	160	166	26	76	106	182	154	162	30	183	12	182	12	184	192	187	201
Number of students		32	154	157	24	64	102	163	146	154	26	181	11	176	11	160	162	167	176
Percentage of students		94.12	96.25	94.58	92.31	84.21	96.23	89.56	94.81	95.06	86.67	98.91	91.67	96.70	91.67	86.96	84.38	89.30	87.56
CO Attainment Level		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO NUMBER		CO1	CO1	CO2	CO2	CO1	CO2	CO1	CO2	CO3	CO3	CO4	CO4	CO5	CO5	CO3	CO4	CO5	ALL COs
MID Questions		PART-A	PART-B	PART-A	PART-B	PART-A	PART-B	A1	A2	PART-A	PART-B	PART-A	PART-B	PART-A	PART-B	A3	A4	A5	
CO-PO MAPPING		MIQ1	MIQ2	MIQ3	MIQ4	MIQ5	MIQ6			M2Q1	M2Q2	M2Q3	M2Q4	M2Q5	M2Q6				

Fig: CIE CAT Sheet

NARAYANA ENGINEERING COLLEGE (A):: NELLORE											
Course Attainment Tool (CAT)											
SEMESTER END EXAM											
S.No	Roll no.	Questions									
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
SEE Questions		12	12	12	12	12	12	12	12	12	12
Max. Marks		12	12	12	12	12	12	12	12	12	12
40 Marks%		5	5	5	5	5	5	5	5	5	5
1	20711A0501	8		10		8			8	8	
2	20711A0502		3		8	8		3		8	
3	20711A0503	8		7			4	6		9	
4	20711A0504	8			8		5	6			8
5	20711A0506		8	8		10		10			8
...	...										
199	21715A0516		6		5	4		3		3	
200	21715A0517	6		6		7		9		8	
201	21715A0518				6	4		5		6	
Number of students attempted question		50	147	76	121	181	14	131	70	153	48
Number of students scoring atleast 40% or more than 40%		38	102	48	102	115	11	105	36	112	40
Percentage of students who get atleast 40% or more than 40% of		76.00	69.39	63.16	84.30	63.54	78.57	80.15	51.43	73.20	83.33
CO Attainment		2	1	1	3	1	2	3	1	2	3
CO NUMBER		CO1	CO1	CO2	CO2	CO3	CO3	CO4	CO4	CO5	CO5
SEE Questions		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
SEE Attainment											
CO		CO Attainment		Average							
CO1		2	1	1.50							
CO2		1	3	2.00							
CO3		1	2	1.50							
CO4		3	1	2.00							
CO5		2	3	2.50							

Fig: SEE CAT Sheet

- Place the CO attainment values in the table and calculate direct attainment levels.

CO	CO Attainment Values						External Attainment	Term work	Direct Attainment
	Question wise								
CO1	3	3	3	3			1.50	3.00	2.10
CO2	3	3	3	3			2.00	3.00	2.40
CO3	3	3	3				1.50	3.00	2.10
CO4	3	3	3				2.00	3.00	2.40
CO5	3	3	3				2.50	3.00	2.70
CO ATTAINMENT ANALYSIS:									

Indirect Attainment Tools- Course End Survey

- Collect the course end survey for each CO and calculate the weighted average

$$= \frac{\text{No. of Highs} \times 3 + \text{No. of Moderates} \times 2 + \text{No. of Lows} \times 1}{\text{No. of students}}$$

COURSE END SURVEY(INDIRECT SURVEY)							
CO	CO DESCRIPTION	Excellent	Good	Fair	Total No. of Students Participated	Total-weighted	LEVEL OF ATTAINMENT
		3	3	1			
CO1	Describe database technologies and database design. (BL-2)	140	28	10	178	486	2.73
CO2	Illustrate Relational data model and relational algebra for data models. (BL-2)	138	25	15	178	479	2.69
CO3	Demonstrate queries, procedures for database creation in RDBMS.(BL-3)	135	30	13	178	478	2.69
CO4	Apply functional dependencies and normalization for database design. (BL-3)	137	21	20	178	473	2.66
CO5	Demonstrate transaction management and concurrency control techniques for database recovery. (BL-3)	139	20	19	178	476	2.67

- CO attainment:** Compute the CO attainment (%) by giving 70% weightage to the direct tools and 30% of Course End Survey.

CO	CO Attainment Values						External Attainment	Term work	Direct Attainment	Indirect (CES) Attainment	CO Attained
	Question wise										
CO1	3	3	3	3			1.50	3.00	2.10	2.73	2.29
CO2	3	3	3	3			2.00	3.00	2.40	2.69	2.49
CO3	3	3	3				1.50	3.00	2.10	2.69	2.28
CO4	3	3	3				2.00	3.00	2.40	2.66	2.48
CO5	3	3	3				2.50	3.00	2.70	2.67	2.69
CO ATTAINMENT ANALYSIS:										Target	2.44

4. Fix the target for each CO and compare with the attained values.
5. If CO is attained, suggest the actions for further improvement and if CO is not attained, analyze the reasons and suggest the actions.

Setting Course Outcome Targets

1. Setting Targets in a course is decided by PAC
2. Current average attainment is considered as target level.
3. Target level can be different for each assessment
4. Same target can be identified for all the COs of a course.

For example:

Analysis:: If a Particular CO has not reached the target level we may analyze and write the following:.

- For the gaps identified it was found that less number of students attempted this question and had an impact on attainment.
- For the gaps identified it was found that students had less preparation and had an impact on attainment
- For the gaps identified it was found that students had less basic knowledge and practice which impacted on the attainment.

ACTION SUGGESTED:

- Faculty is requested to conduct tutorial classes on the particular subject.
- Students must be encouraged to take NPTEL videos

PO Attainment

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO12	PSO1	CO Attained Levels
CO1	3	1											2		2.29
CO2	3	2											1		2.49
CO3	3	2											2		2.28
CO4	3	2											2		2.48
CO5	3	1											1		2.69
TOTAL	5	5											5		
Sum of CO+PO	12.22	6.49											6.42		
CO-PO LEVEL	2.45	1.30											1.29		

Attainment of POs and PSOs is based on direct assessment tool as well as indirect assessment tool.

1. Direct Assessment Tool:

- Direct assessment of POs and PSOs is based on the students' performance in both CIE and SEE for all courses.

- Performance of all the students in different assessments such as internal examinations and SEE examinations lead to attainment of COs which in turn lead to attainment of POs and PSOs based on the mapping of COs with POs and PSOs.
- Direct Assessment Tool is given 80% weightage in the attainment of POs and PSOs.

2. Indirect Assessment Tools:

- The indirect assessment tools that are used for attainment of POs and PSOs are
 - Graduate Exit Survey (10% weightage)
 - Alumni Survey (5% weightage)
 - Employer Survey (5% weightage)

A. The quality and Relevance of the Process used for measuring Attainment of POs and PSOs:

a. Direct Assessment

Step 1:

- POs and PSOs attainment at course level is calculated by taking the average of arithmetic multiplication of course outcomes attainment levels and CO-PO matrix.

$$\text{Course - PO attainment level} = \frac{\text{Sum of ((each CO - PO mapping)/ 3) x CO attainment level}}{\text{Total number of COs mapped}}$$

Step 2: Calculate the individual course POs as mentioned in step 1 and tabulate. Calculate the average of all individual course POs. The direct PO attainment level weightage is 80% of the average of all individual course POs.

b. Indirect Assessment:

The Indirect assessment Tools are Graduate Exit Survey, Alumni Survey and Employer Survey

Collect the Surveys and calculate the weighted average for each survey as mentioned below.

$$= \frac{\text{No.of Highs} \times 3 + \text{No.of Moderates} \times 2 + \text{No.of Lows} \times 1}{\text{No.of students}}$$

The weightage given to Indirect Assessment is 20% as given below:

The weightage of Graduate Exit Survey (GES) -10%.

The weightage of Alumni Survey (AS) - 5%.

The weightage of Employer Survey (ES) - 5%.

c. Overall Attainment of POs and PSOs:

Attainment of POs and PSOs = 80% of Direct Assessment + 20% of Indirect Assessment.

$$(0.8 * \text{Direct PO attainment} + 0.1 * \text{GES} + 0.05 * \text{AS} + 0.05 * \text{ES})$$

NARAYANA ENGINEERING COLLEGE:: NELLORE
Department of Computer Science and Engineering
Graduate Exit Survey

The information you provide on this questionnaire will be kept completely confidential.

Name & Roll Number:

Batch:

Email:

Your feedback will surely assist the department to continue upgrading the program to provide better service to the students and community.

PROGRAMME OUTCOMES ASSESSMENT

By this time you should have gained the outcomes of the programme and attained the required professional, technical and social experiences. For assessment kindly use the following assessment criteria by placing a '✓' at the appropriate place: **High=3, Medium=2 and Low=1**

ASSESSMENT CRITERIA		3	2	1
PO1	Are you able to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex mechanical engineering problems?			
PO2	Are you able to identify formulate, review research literature, and analyze complex mechanical engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences?			
PO3	Are you able to design solutions for complex mechanical 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	Are you able to 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	Are you able to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex mechanical engineering activities with an understanding of the limitations?			
PO6	Are you able to 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	Are you able to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development?			
PO8	Are you able to apply ethical principles and commit to professional ethics and responsibilities and norms of the mechanical engineering practice?			
PO9	Are you able to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings?			
PO10	Are you able to communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions?			
PO11	Are you able to 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	Are you able to 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?			
PSO1	Domain Specific Knowledge: Apply the relevant techniques to develop solutions in the domains of algorithms, system software, computer programming, multimedia, web, data and networking.			
PSO2	Software Product Development: Apply the design and deployment principles to deliver a quality software product for the success of business of varying complexity.			

Date

Signature

NARAYANA ENGINEERING COLLEGE :: NELLORE
Department of Computer Science and Engineering

ALUMNI SURVEY FORM

The objective of the Survey is:

1. To gather information on the Assessment of the Programme Educational Objectives (PEOs), Programme outcomes (POs) and Programme specific outcome (PSOs) statements.
2. To measure our graduate accomplishments after few years of graduation (PEO).

Department will be grateful if you spare some time to complete this survey form. Please tick in the small boxes and enter data in the space provided.

Name :

Year of Graduation:

Email :

Current Position:

Note: For assessment in Part-I, Part-II and Part-III by placing a ‘√’ at the appropriate place. **High-3, Moderate-2, Low-1**

PART I: PROGRAMME OUTCOMES ASSESSMENT

ASSESSMENT CRITERIA		3	2	1
PO1	Are you able to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems?			
PO2	Are you able to identify formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences?			
PO3	Are you able to 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	Are you able to 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	Are you able to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations?			
PO6	Are you able to 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	Are you able to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development?			
PO8	Are you able to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice?			
PO9	Are you able to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings?			
PO10	Are you able to communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions?			
PO11	Are you able to 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	Are you able to 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?			

PART II :PROGRAMME OUTCOMES ASSESSMENT

ASSESSMENT CRITERIA		3	2	1
PSO1	Are you able to apply the relevant techniques to develop solutions in the domains of algorithms, system software, computer programming, multimedia, web, data and networking.			
PSO2	Are you able to Apply the design and deployment principles to deliver a quality software product for the success of business of varying complexity?			

PART III: PROGRAMME EDUCATIONAL OBJECTIVES ASSESSMENT:

ASSESSMENT CRITERIA		3	2	1
1	Procure employment/progress towards higher degree and practice successfully in the CS/IT profession. (Successful Career Goals).			
2	Address complex problems by adapting to rapidly changing IT technologies.(Professional Competency).			
3	Gain respect and trust of others as effective and ethical team member by demonstrating professionalism and functioning effectively in team-oriented and open-ended activities in industry and society.(Leadership, Ethics and Contribution to Society).			

General Comments

Please make any additional comments or suggestions, which you think would help strengthen our programs for the preparation of graduates who will enter your field.

Thank you for sparing your valuable time.

Date:

Signature

NARAYANA ENGINEERING COLLEGE: NELLORE

EMPLOYER FEEDBACK FORM

The objective of the Survey is to gather information on the Assessment of the Programme outcomes (POs) and Programme specific outcome (PSOs) statements.

1. Name of the Company : _____
2. Address : _____
3. Email: _____

Note: kindly use the following assessment criteria by placing a ‘√’ at the appropriate place. High-3, Moderate-2, Low-1

At your company, how well are the students from NECN prepared to:

ASSESSMENT CRITERIA		3	2	1
PO1	Do our graduates are talented to apply the principles of mathematics, science, engineering fundamentals, and an engineering specialization to solve real world			
PO2	Do our graduates are talented to analyze engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences?			
PO3	Do our graduates are talented to Design solutions for complex engineering problems.			
PO4	Do our graduates are talented to conduct investigations for complex problem.			
PO5	Do our graduates are talented to apply appropriate techniques, resources, and modern engineering and IT tools.			
PO6	Do our graduates are talented to Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues.			
PO7	Do our graduates are able to demonstrate the knowledge for sustainable development.			
PO8	Do our graduates are able to Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice?			
PO9	Do our graduates are able to demonstrate leadership qualities			
PO10	How do you rate our graduate’s oral and written communication abilities?			
PO11	Do our graduates are able to Demonstrate knowledge and understanding of the engineering and management principles to manage projects.			
PO12	Do our graduates have the ability to engage in life-long learning in the broadest context of technological change?			
PSO1	Do our graduates are able to apply the relevant techniques to develop solutions in the domains of algorithms, system software, computer programming, multimedia, web, data and networking.			
PSO2	Do our graduates are able to Apply the design and deployment principles to deliver a quality software product for the success of business of varying complexity.			

Thanks for your time.

Date:

Signature

10.3 Continuous Improvement

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

Outcome	Action to be taken by faculty
All CO-PO attained highly (>2.5 out of 3)	Set new higher targets or attainment levels for next Academic Year (A.Y.).
All CO-PO attained moderately (1.8 to 2.49 out of 3)	Record observations, Continue action plan of last A.Y. with plan for improvements.
All CO-PO attained lowly (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 Committee (PAC), Revise action plan of last A.Y. at faculty/department level.

A) PO attainment and Continuous Improvement (PC Level)

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

Closing the Quality Loop at the Program Level

For each PO and PSO:

- Attainment target is set by PAC, The attainment evaluation is performed by PAC
- Total attainment value for each PO and PSO is computed and checked it against target.
- The areas of weaknesses are identified in the program based on the analysis of evaluation of POs & PSOs attainment levels. Measures identified and implemented to improve POs & PSOs attainment levels for the next assessment years.