DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

CO-PO/PSO's-PEO'S ASSESSMENT & ATTAINMENT PROCESS MANUAL

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

Autonomous Institution, UGC-Govt. of India

Accredited by NBA & NAAC with 'A' Grade UGC, Govt.of India
NIRF Indian Ranking–2018, Accepted by MHRD, Govt. of India

AAA+ Rated by Careers 360 Magazine, National Ranking-Top 100 Rankband by Outlook 7th Rank by CSR in Outstanding Engineering Colleges of Excellence Category

(Permanently Affiliated to JNTUH, Approved by AICTE, ISO 9001:2015 Certified Institution)

Maisammaguda, Dhullapally, Secunderabad, Kompally-500100

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1. INSTITUTE VISION AND MISSION

VISION

- Visualizing a great future for the intelligentsia by imparting state-of the art Technologies in the field of Engineering and Technology for the bright future and prosperity of the students.
- To offer world class training to the promising Engineers.

MISSION

- To nurture high level of Decency, Dignity and Discipline in women to attain high intellectual abilities.
- To produce employable students at National and International levels by effective training programmes.
- To create pleasant academic environment for generating high level learning attitudes

2. DEPARTMENT VISION AND MISSION

VISION

Our vision is to develop the department in to a full fledged Centre of learning in various fields of Electronics and Communication Engineering keeping in view the latest developments and to invoke enthusiasm among the students to continually renew their education in the rapidly developing technological scenario.

MISSION

Our mission is to inculcate a spirit of scientific temper and analytical thinking & train the students in contemporary technological trends in electronics and communication to meet the challenging needs of the industry by providing versatile sound knowledge in the field of engineering and technology.

The Process for Defining Vision and Mission of the Department

The following steps are followed to establish Vision and Mission of Department

Step 1. The Vision & Mission of the Institute is taken as the basis.

Step 2: The Department conducts brain-storming sessions with the faculty on the skill-set required by the local and global employers, Industry Advances in Technology and R & D, and the draft copy of the Vision and Mission of the Department is drafted.

Step 3: The views from Parents, Professional Bodies, Industry representatives and Board of Studies (BOS) on the draft are also collected and incorporated to revise the draft version based on their inputs.

Step 4: The accepted views are analyzed and reviewed to check the consistency with the vision and mission of the institute.

The process for defining department vision and mission are illustrated in the flow chart Figure 2.1.

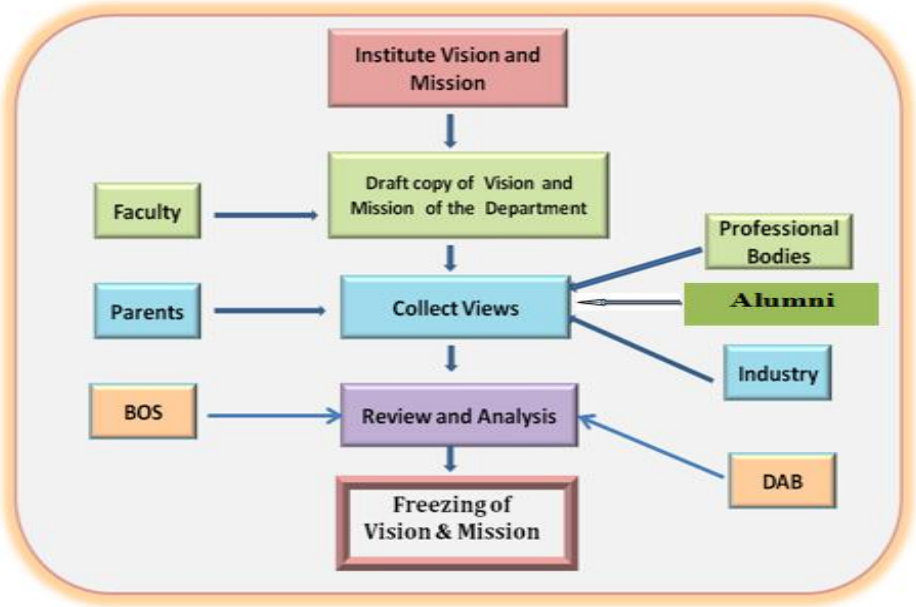


Figure 2.1 Process for defining Vision and Mission of the Department

3. PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Program Educational Objectives (PEOs):

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs):

Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the graduates of a specific engineering program should be able to do.

4. STATEMENTS OF PEOs, POs AND PSOs

4.1 PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO1-PROFESSIONAL DEVELOPMENT

To develop in the students the ability to acquire knowledge of Mathematics, Science & Engineering and apply it professionally within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability with due ethical responsibility.

PEO2-CORE PROFICIENCY

To provide ability to identify, formulate, comprehend, analyze, design and solve engineering problems with hands on experience in various technologies using modern tools necessary for engineering practice to satisfy the needs of society and the industry.

PEO3- TECHNICAL ACCOMPLISHMENTS

To equip the students with the ability to design, simulate, experiment, analyze, optimize and interpret in their core applications through multi disciplinary concepts and contemporary learning to build them into industry ready graduates.

PEO4- PROFESSIONALISM

To provide training, exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude towards ethical issues, team work, responsiblility, accountability, multidisciplinary approach and capability to relate engineering issues to broader social context.

PEO5- LEARNING ENVIRONMENT

To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, inventiveness, leadership, written ethical codes and guidelines and the life-long learning to become a successful professional in Electronics and Communication Engineering.

The Process for Establishing the PEO's

The PEOs are established through the following process steps:

STEP 1: Vision and Mission of the Institute & Department are taken into consideration to interact with various stake holders, and establish the PEO's

STEP 2: The Head of the Department, Program Coordinator and other Senior Faculty prepares the draft version of PEOs and POs.

STEP 3: The draft version is discussed with stakeholders and their views are collected by the Program co-coordinator

STEP 4 : The Program Assessment Committee reviews and analyzes the PEOs and Pos and submits its Recommendations to the Departmental advisory Board.

STEP 5: The Departmental advisory Board deliberates on the recommendations and freezes the PEOs and POs and submits them to the BOG for final approval.

The Program curriculum is designed by incorporating inputs from members of Board of Studies and Academic council who are drawn from various academic institutions, R&D organizations and industry.

- Inputs are also obtained from alumni and other stake holders.
- Besides, a skill in demand analysis is carried out periodically to identify the core areas in the ECE domain that are consistent with industry needs.
- Thus the PEOs are established, checked for consistency with the mission statement of the department.

The process steps followed for establishing the PEO's for B.Tech (ECE) program are illustrated in the flow chart Figure 4.1.

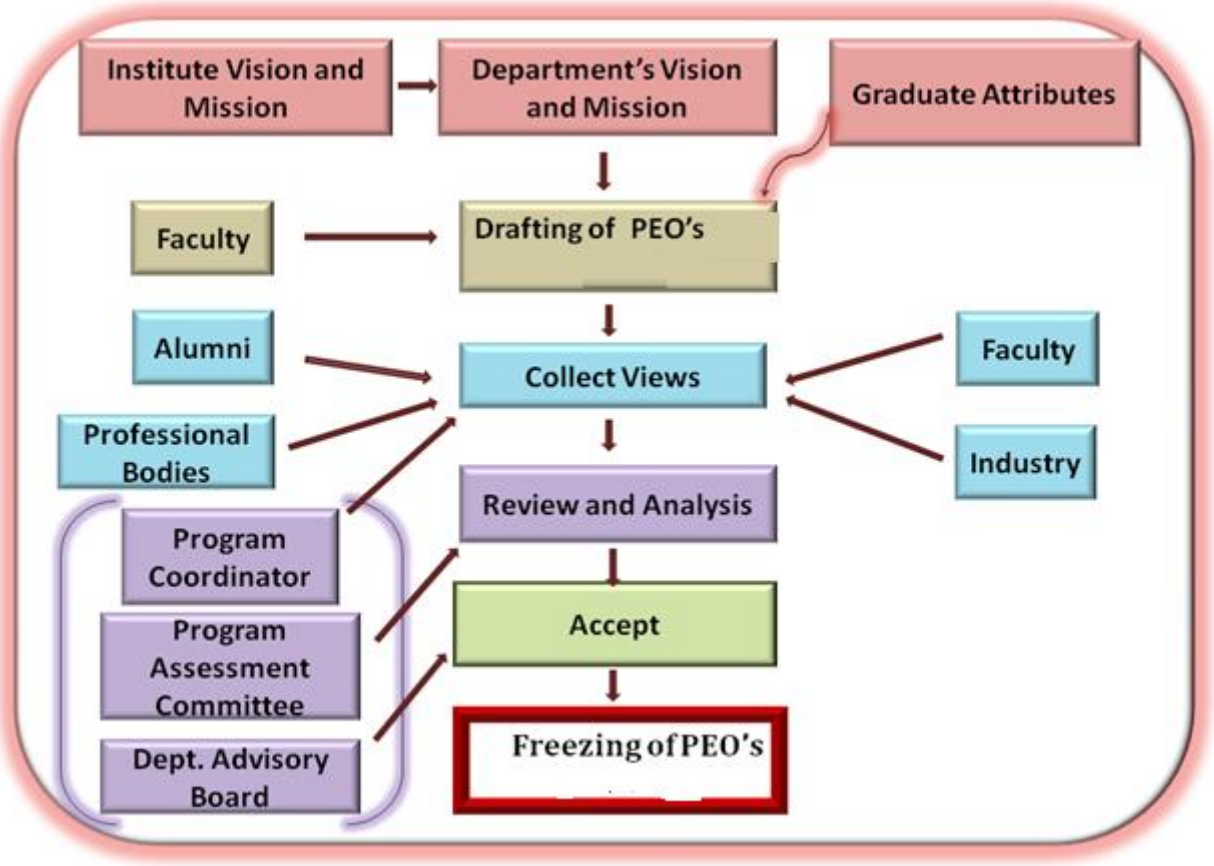


Figure 4.1: Process to Define PEO's of the Department

4.2 PROGRAM OUTCOMES (POs):

Program Outcomes		
PO1	**Engineering knowledge**	An ability to apply knowledge of mathematics(including probability, statistics and discrete mathematics), science, and engineering for solving Engineering problems and modeling
PO2	**Problem analysis**	An ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components
PO3	**Design / development of solutions**	An ability to design a complex electronic system or process to meet desired specifications and needs
PO4	**Conduct investigations of complex problems**	An ability to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.
PO5	**Modern tool usage**	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice
PO6	**The engineer and society**	An understanding of professional, health, safety, legal, cultural and social responsibilities
PO7	**Environment and sustainability**	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development.
PO8	**Ethics**	Apply ethical principles, responsibility and norms of the engineering practice
PO9	**Individual and team work**	An ability to function on multi-disciplinary teams.
PO10	**Communication**	An ability to communicate and present effectively
PO11	**Project management and finance**	An ability to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi-disciplinary environments
PO12	**Life-long learning**	A recognition of the need for, and an ability to engage in, to resolve contemporary issues and acquire lifelong learning

The POs are published and disseminated

The Program Outcomes are published and disseminated as follows

Table 4.1: PO publishing and dissemination

How Published	Where Published	How Disseminated
• Incorporating in booklet given in orientation, syllabus book, course files and lab manuals	• Orientation booklet • syllabus books • Course files and lab manuals • Laboratories in the departments	• Distribution and explanation to students on orientation day • Discussed during Orientation Day • Discussed during student Counseling • Distributed along with Syllabus books, course files and lab manuals
• Flexis	• Class rooms/ Laboratories • Office of the department • Department Notice boards • Staff Rooms	• Self-reading by students, parents and alumni
• Digital Media	• Institute Website ✓ www.mallareddyecw.ac.in	• Available for Self-reading in public domain

The Process for Establishing the PO's

The POs are established through the following process steps:

The Vision, Mission PEOs of the Department along with the 12 Graduate Attributes given by the NBA are used in defining the POs.

Step 1: Program Coordinator consults the key constituents: faculty and collects their views and prepares the draft version of the PEOs and POs.

Step 2: The Program Coordinator then gather views from the Alumni, Professional Body representatives, Industry representatives / Employer along with the faculty and revise the draft.

Step 3: The Program Assessment Committee analyze and express its opinion on the revised PEOs and POs and forwards the same for final approval to Department Advisory Board.

Step 4: Department Advisory Board deliberate on the views expressed by the Program Assessment Committee and formulate the accepted views based on which POs are to be established.

However, the views expressed by them were in line with the graduate attributes defined by NBA.

Fig . 4.2 Process to Define Program Outcomes of the Department

4.3 PROGRAM SPECIFIC OUTCOMES (PSOs):

The graduates of the department will attain:

PSO1: The ability to analyze, design and implement application specific electronic system for complex engineering problems for analog, digital domain, communications and signal processing applications by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO2: The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues relevant to professional engineering practice through life-long learning.

PSO3: Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

5. BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

BLOOM'S TAXONOMY		
Domains	**Keywords**	**Example**
Remembering: Recall or retrieve previous learned information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states	Recite a policy. Quote prices from memory to a customer. Recite the safety rules.
Understanding: Comprehending the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewrite the principles of test writing. Explain in one's own words the steps for performing a complex task. Translate an equation into a

own words.		computer spreadsheet.
Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses	Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.
Analyzing: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates	Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.
Evaluating: Make judgments about	appraises, compares, concludes, contrasts,	Select the most effective solution.

the value of ideas or materials.	criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports	Hire the most qualified candidate. Explain and justify a new budget.
Creating: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes	Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome.

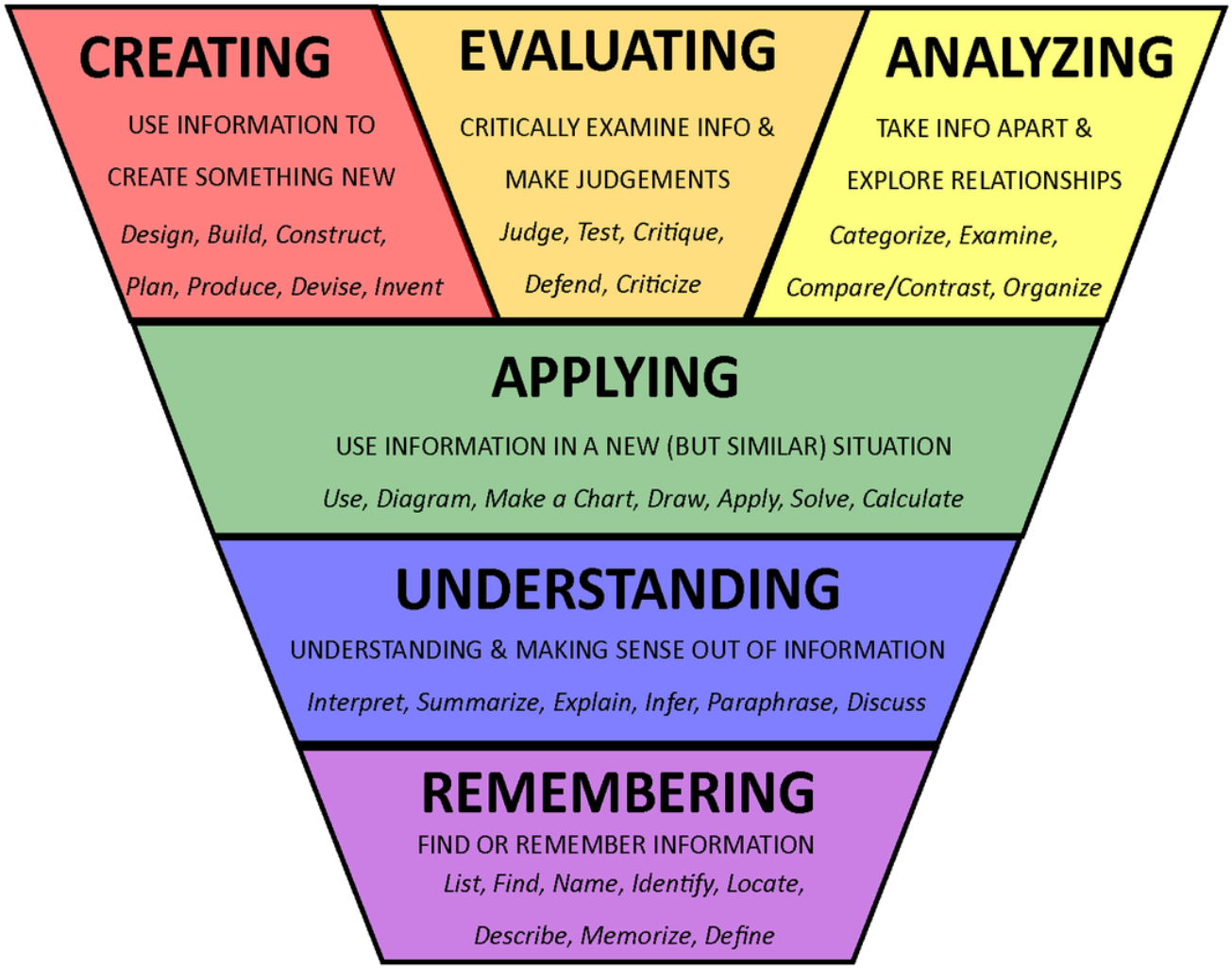


Figure 5.1 Pictorial representation of Blooms Taxonomy

6. COURSE OUTCOME STATEMENT

Course Outcomes (COs): Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each module of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

SAMPLE CO STATEMENTS:

Course: ELECTRONIC DEVICES AND CIRCUITS (1804PC01)

Course Code: 1804PC01

On successful completion of this course, students should be able to

Table 6.1: Sample CO statements

CO	COURSE OUTCOMES DESCRIPTION
CO1	Understand and Analyse the different types of diodes, operation and its characteristics
CO2	Design and analyse the DC bias circuitry of BJT and FET
CO3	Design biasing circuits using diodes and transistors
CO4	To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices

7. CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together 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 as shown below. The various correlation levels are:

- **"1"** – Slight (Low) Correlation
- **"2"** – Moderate (Medium) Correlation
- **"3"** – Substantial (High) Correlation
- **"-"** indicates there is no correlation.

7.1 Levels of Outcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO).

Course Outcomes are the statements that declare what students should be able to do at the end of a course. POs are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal engineering program should have. Graduates Attributes (GAs) are the components indicative of the graduate‟s potential to acquire competence to practice at the appropriate level. GAs form a set of individually assessable outcomes of the programme. The NBA laid down the graduate attributes relating to programme outcomes and is to be derived by program.

The Program outcomes reflect the ability of graduates to demonstrate knowledge in fundamentals of Basic Sciences, Humanities and Social Sciences, Engineering Sciences and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of graduation. The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society. These outcomes also enable the graduate to pursue higher studies and engage in R&D for a successful professional career.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, design, development, production and testing of novel products, ability to deal with finances and project management during his/her early professional career of 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepare the grandaunts to achieve.

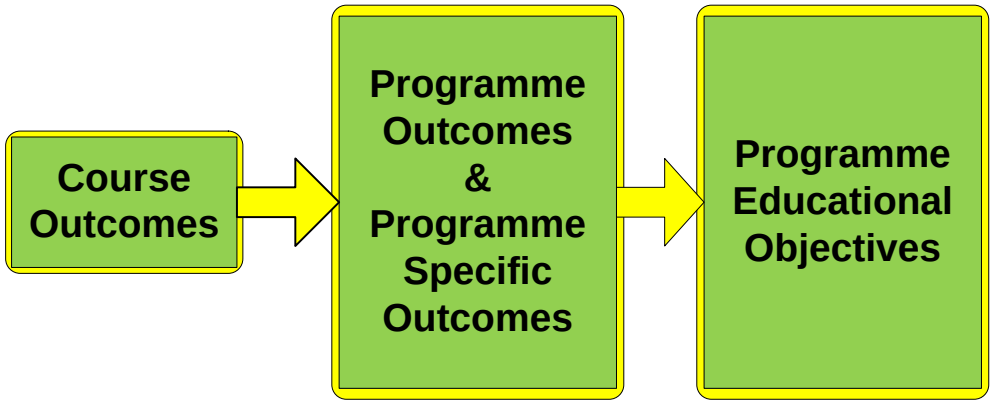


Figure 7.1: Relating the outcomes (CO-PO&PSO-PEO)

Figure 7.1 shows the building block of CO-PO&PSO-PEO relationship. After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program. . This is shown in figure 7.2.

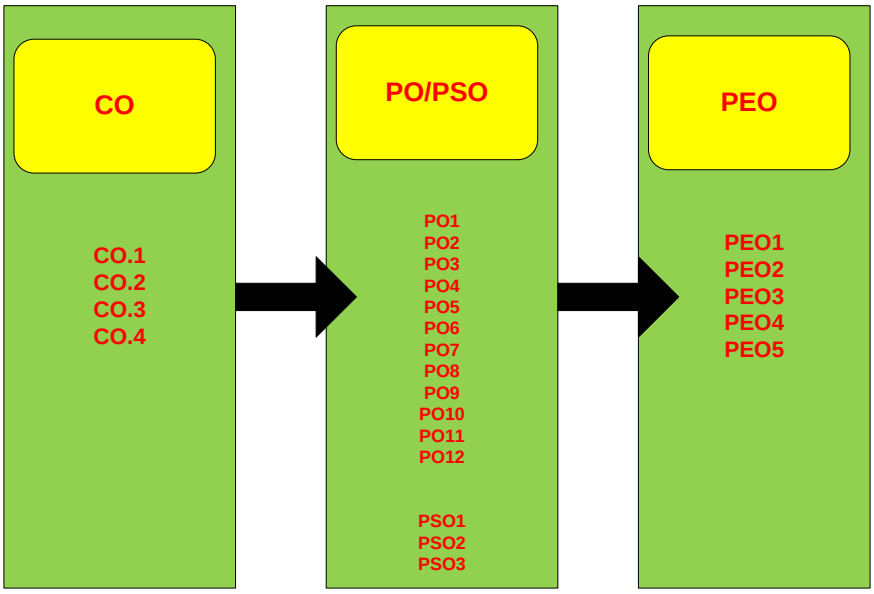


Figure 7.2 : Relationship between CO, PO &PSO and PEO

7.2 Process involved in CO-PO Mapping

The role of CO-PO mapping will be assigned to the faculty as per hierarchy followed in figure 7.3. After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate COs for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behavior that students will acquire through the course.

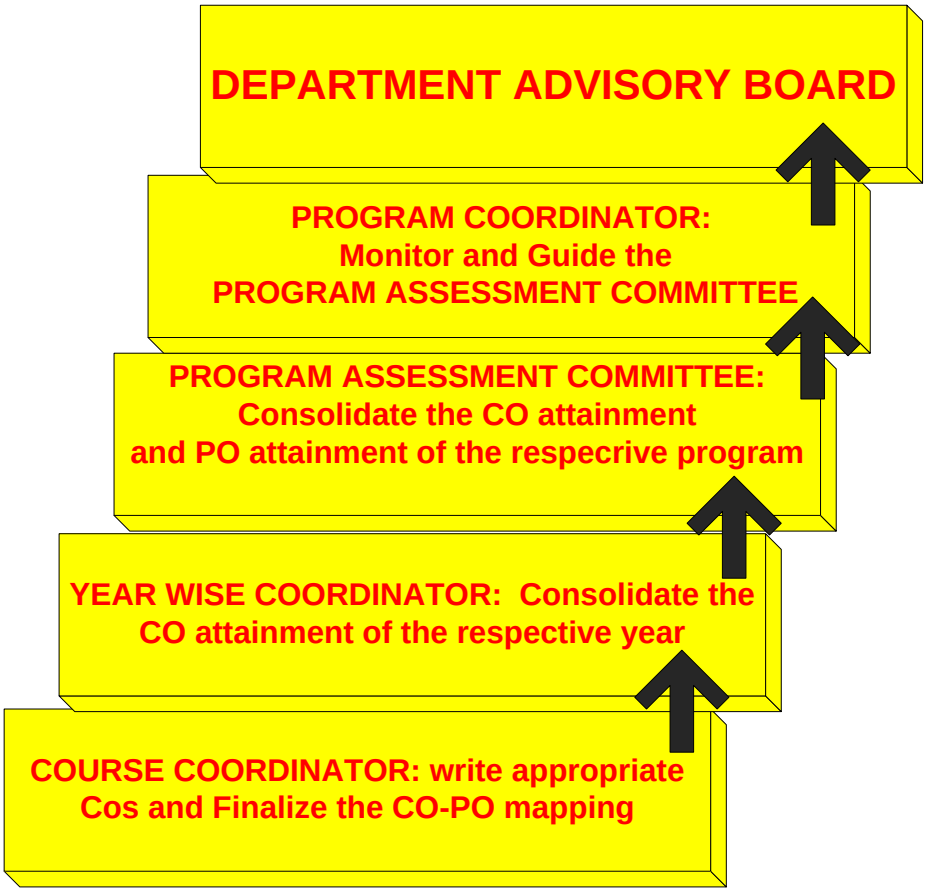


Figure 7.3: Hierarchy of faculty involvement

After writing the CO statements, CO will be mapped with PO of the department. If the department is having more than one section in a year or the same course is available for more than one program of the same institute in a semester, the subject expert will be nominated as course coordinator of the corresponding course. The role of the course coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the eighth semester. The Program coordinator has to evaluate the PO

attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Department Advisory Board (DAB).

7.3 SAMPLE CO-PO AND CO-PSO MAPPING:

Course: ELECTRONIC DEVICES AND CIRCUITS(1804PC01)

Course Code: 1804PC01

Mapping of CO with PO

First two numeric digit indicates year of study and next two digits indicate branch number in the respective year of study. PC01 is the first course in second year. A sample course outcome statements and sample CO-PO matrix are given in Table 7.1 based on CO statements given in table 6.1.

The CO-PO mapping has been done with correlation levels of 3, 2, 1 and '-'. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low). The meaning of '-' is no correlation between CO and PO.

Table 7.1: Sample CO-PO Matrix

Course Outcome EDC(1804PC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H											
CO2		H	H									
CO3			H	H								
CO4				H	S				M	M		M

Course Outcome EDC(1804PC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2		3	3									
CO3			3	3								
CO4				3	1				2	2		2
Average CO(EDC)	3	3	3	3	1				2	2		2

Course Outcome EDC(1804PC01)	PSO1	PSO2	PSO3
CO1	3		
CO2		3	
CO3			3
CO4	3		3
Average CO(EDC)	3	3	3

7.4 Process used to identify the curricular gaps to the attainment of COs/POs

The process used to identify the curricular gaps to the attainment of COs/POs is given in figure 7.3 and is explained as below:

Step-1:

The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.

Step-2:

The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Yearwise coordinator.

Step-3:

The year wise coordinators who are the members of the PAC would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.

Step-4:

The PAC would consolidate the CO and PO attainment of the programme with all the identified gaps and submit report to DAB.

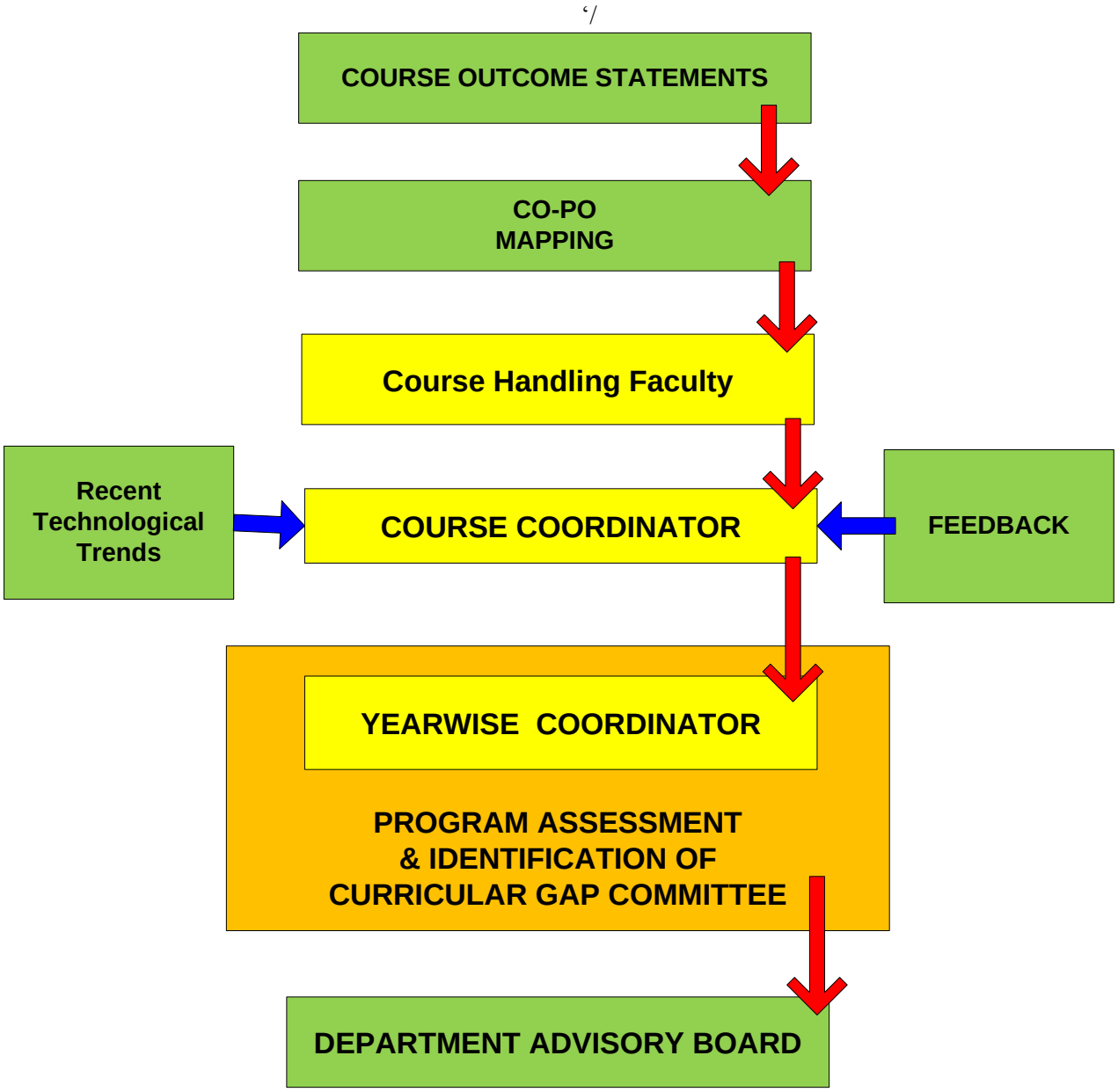


Figure 7.3: Identification of curricular gap

Program Assessment Committee after getting prior approval from DAB about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, in plant training, online quiz, etc.

8. COURSE OUTCOMES TO PO AND PSO MAPPING

Mapping strength of a course to PO/ PSO can be obtained by taking the average of the CO-PO/ PSO mapping matrices of that course.

SAMPLE COURSE-PO AND COURSE-PSO MAPPING

Course: ELECTRONIC DEVICES AND CIRCUITS(1804PC01)

Course Code: 1804PC01

Course Outcome EDC(1804PC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Average CO(EDC)	3	3	3	3	2				2	2		2

Course Outcome EDC(1804PC01)	PSO1	PSO2	PSO3
Average CO(EDC)	3	3	3

Program level CO-PO matrix for all the courses including first year courses will be done by the program coordinator and a sample is given in figure 8.1.

MAPPING OF COURSE WITH PO's and PSO's FOR BATCH: 2014-2018

YR/SEM	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
FIRST YEAR	A10003	3.0	3.0	1.5	2.0	-	-	-	-	-	-	-	1.0	2.0	-	-
	A10002	3.0	3.0	-	2.0	-	-	-	-	-	-	-	1.0	3.0	-	-
	A10004	3.0	2.2	2.3	-	-	-	-	2.0	2.0	-	-	2.0	3.0	2.0	-
	A10081	2.0	2.0	3.0	-	-	-	-	-	2.0	2.0	-	2.0	1.0	-	-
	A10005	3.0	2.0	2.0	2.7	1.0	2.0	2.0	-	2.0		2.0	3.0	1.0	2.0	-
	A10001	-	-	-	-	-	2.3	-	3.0	3.0	3.0		3.0	-	2.0	3.0
	A10301	3.0	3.0	1.0	3.0	1.0	-	-			3.0	1.0	1.0	3.0	-	-
	A10082	2.5	2.5	1.5	1.0	1.0	1.0	-	-	-	-	-	1.0	2.0	1.0	-

	A10581	3.0	2.0	-	3.0	-	-	3.0	-	2.5	3.0	2.5	2.5	-	-	-
	A10083	-	-	-	2.0		2.0	2.0	3.0	3.0	3.0	-	3.0	-	-	-
	A10501	2.8	2.0	-	2.7	-	-	3.0	-	2.7	3.0	2.5	2.2	2.0	-	-
II YEAR I SEMESTER	A30007	3.0	3.0	-	2.0	-	-	-	-	-	-	-	1.0		-	-
	A30481	1.0	2.0	1.8	1.0	1.3	-	-	-	-	-	-	-	2.0	-	-
	A30204	1.8	1.0			-	-	-	-	-	-	-	-	2.0	-	-
	A30482	1.8	1.0	1.5	1.5	-	1.0	-	-	-	-	-	-	2.0	-	-
	A30404	2.8	2.7	2.3	-	-	-	-	-	-	-	-	-	3.0	-	-
	A30405	2.5	1.8	-	1.7	1.0	-	-	-	-	-	1.0	-	3.0	-	-
	A30406	2.6	2.7	1.2	-	1.0	-	-	-	-	-	-	2.3	3.0	-	-
	A30407	2.7	2.0	-	1.8	1.0	-	-	-	-	-	1.0	-	3.0	-	-
II YEAR II SEMESTER	A40410	1.8	1.8	1.7	-	1.8	-	-	-	-	-	1.0	-	2.0	-	-
	A40412	1.8	1.8	1.2	1.2	-	-	-	-	-	-	-	-	3.0	-	-
	A40411	2.7	2.2		2.7	-	-	-	-	-	2.5	-	-	3.0	-	-
	A40009	1.8	1.8	1.0	1.0	-	-	-	-	-	-	-	1.0	-	3.0	3.0
	A40415	2.7	1.0	1.0	-	1.0	-	-	-	-	-	-	-	3.0	-	-
	A40215	2.3	2.6	2.0	-	-	-	-	-	-	-	-	-	1.0	-	-
	A40288	1.7	1.0	1.8	2.0	2.0	-	-	-	-	-	-	1.8	1.0	-	-
	A40484	1.5	1.8	1.5	1.5	-	-	-	-	-	-	-	1.3	2.0	-	-
III YEAR I SEMESTER	A50487	3.0	3.0	2.7	-	-	-	-	-	-	-	-	-	3.0	-	-
	A50408	3.0	3.0	3.0	2.4	-	-	-	-	-	-	-	-	3.0	-	-
	A50418	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	-	-	3.0	-	-
	A50516	3.0	2.9	2.7	2.7	-	-	-	2.5	-	2.8	3.0	2.9	1.0	-	-
	A50217	3.0	3.0	2.9	2.7	3.0	-		2.5	-	2.8	3.0	2.9	1.0	-	-
	A50422	3.0	2.8	2.8	2.4	-	-	-	2.5	-	2.7	3.0	2.8	2.0	-	-
	A50488	3.0	2.9	2.8	2.6	3.0	-	-	2.5	-	2.8	3.0	2.9	3.0	-	-
	A50425	3.0	2.9	2.8	2.6	3.0	-	-	2.5	-	2.8	3.0	2.9	3.0	-	-
III YEAR II SEMESTER	A60420	3.0	2.5	2.0	2.5	2.0		2.0	-	-	3.0	-	2.0	3.0	-	-
	A60493	3.0	3.0	3.0	2.0	2.0	-	-	-	-	-	-	-	3.0	-	-
	A60421	2.5	2.8	2.3	2.8		-	-	-	-	-	-	-	3.0	-	-
	A60017	-	-	-	-	-	3.0	-	3.0		2.7	2.5	3.0	-	3.0	3.0
	A60010	3.0	3.0	3.0	3.0	3.0	-	2.0	-	-	2.8	2.5	2.2	-	3.0	3.0
	A60494	3.0	3.0	2.7	3.0	-	-	-	-	-	3.0		3.0	3.0	-	-
	A70086	-	-	-	-	-	-	-	2.5		2.7	3.0	2.7	3.0	-	-
	A60432	3.0	2.8	2.8	2.4	-	-	-	-	-	-	-	3.0	3.0	-	-
IV YEAR ISEMESTER	A70434	2.8	2.8	2.6	2.6	2.0	-	3.0	-	-	2.7	-	2.6	3.0	-	-
	A70515	2.2	2.0	3.0	2.5	2.0	-	-	-	-	-	-	2.0	3.0	-	-
	A70505	2.7	2.5	2.5	2.5	3.0	-	-	-	-	-	-	3.0	1.0	-	-
	A70014	2.7	3.0	2.5	3.0	-	-	-	2.0	3.0	2.7	2.8	2.6	-	3.0	3.0
	A70442	2.6	2.2	2.3	3.0	2.0	-	-	-	-	2.0	2.0	2.5	3.0	-	-
	A70444	3.0	2.3	2.5	2.5	2.0	-	-	-	2.0	2.0	-	2.0	2.0	-	-
	A70086	-	-	-	-	-	-	-	2.5	-	2.7	3.0	2.7	-	2.0	3.0

	A70499	3.0	3.0	3.0	3.0	2.5	-	-	2.7	-	2.7	-	2.5	3.0	-	-
IV YEAR II SEMESTER	A80450	3.0	2.7	3.0	2.5	2.0	-	-	-	2.0	2.0	2.0	2.0	3.0	-	-
	A80452	3.0	3.0	3.0	3.0	-	-	-	-	2.5	2.5	2.0	2.5	3.0	-	-
	A80454	3.0	3.0	2.0	3.0	2.0	3.0	1.0	-	2.0	2.0	-	2.0	3.0	-	-
	A80090	3.0	3.0	-	-	-	-	-	-	-	2.0	-	-	-	2.0	2.0
	A80088	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	-	2.0	-	3.0	3.0
	A80087	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	-	-	-	3.0	3.0
	A80089	3.0	3.0	3.0	3.0	3.0	-	-	-	-	3.0	-	-	-	2.0	3.0
AVERAGE		2.7	2.5	2.3	2.4	2.1	2.0	2.3	2.6	2.4	2.6	2.3	2.2	2.5	2.4	2.9

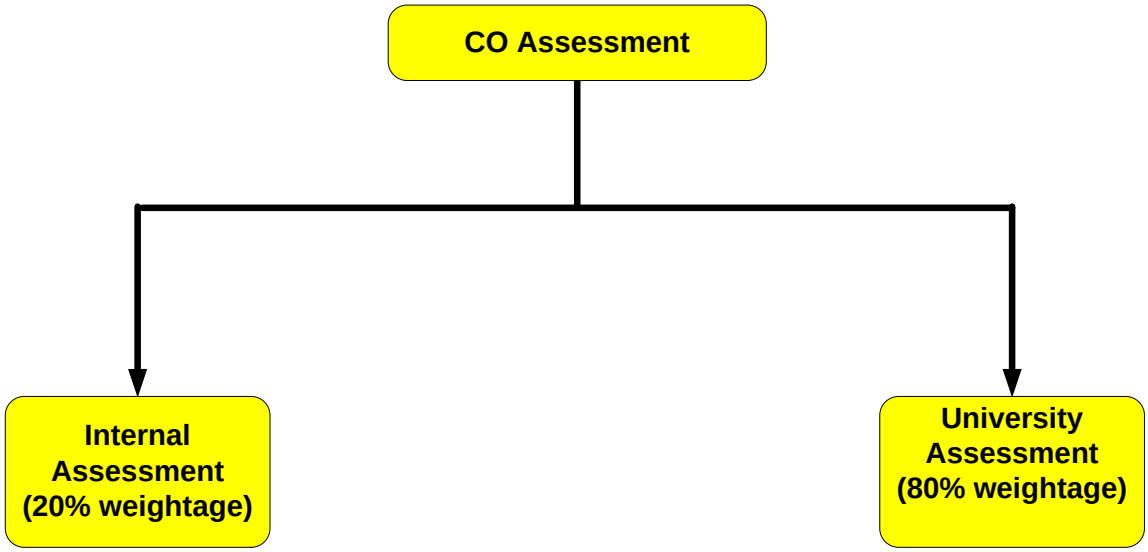
Figure 8.1: Program level CO-PO matrix

9. ASSESSMENT PROCESS

9.1 Assessment Process for CO Attainment:

For the evaluation and assessment of CO's and PO's, rubrics are used. The rubrics considered here are given below:

(i) CO Assessment Rubrics:



Course Outcome is evaluated based on the performance of students in internal assessments and in university examination of a course. Internal assessment contributes 20% and university assessment contributes 80% to the total attainment of a CO.

(ii) CO Assessment Tools:

The description of Assessment tools used for the evaluation of program outcomes is given in Table 9.1. The various assessment tools used to evaluate COs and the frequency with which the assessment processes are carried out are listed in table 9.2.

In each course, the level of attainment of each CO is compared with the predefined targets, if is not the course coordinator takes necessary steps for the improvement to reach the target. With the help of CO against PO/PSO mapping, the PO/PSO attainment is calculated by the programme coordinator.

Table 9.1: Mapping of assessment tools to POs/PSOs with frequency

Mode of Assessment	Assessment Tool	Description	Evaluation of Course Outcomes	Related POs/PSOs	Frequency of assessment
Direct	Theory Internal Examinations	Two written examinations are conducted and its average marks are considered.	The questions in the internal examinations and assignment sheets are mapped against COs of respective course. The questions for two internal examinations and Assignments are framed in such a way to cover all course outcomes. The final attainment for each CO under direct assessment is calculated by taking average of the CO attainments from Internal Examinations and Assignments.	PO 1 to PO 12	Two per Semester
Direct	Assignments	Two assignments are given for each course for continuous assessment. Average marks are considered.		PO 1 to PO 12	Continuous
Direct	Day to day evaluation	The day to day evaluation is considered.	The final attainment for each CO is calculated by taking average of the % attainment from day to day evaluation and Internal Lab Examination.	PO 1 to PO 12	Continuous
Direct	Internal Practical Examination	Internal examination is conducted in lab course.		PO 1 to PO 12	One per Semester
Direct	Industry Oriented Mini-Project	To test student's concepts in design, creative thinking and independent analysis. Two project reviews are conducted	Two Internal project reviews are conducted and average of these two review assessments are considered .	PO 1 to PO 12	One project review in VII Semester
Direct	Comprehensive Viva Voice Examination	To assess the student's technical and analytical skills in the domain of electrical and electronics engineering and also communication skills.	The assessment is carried out by HoD and three senior faculty members along With student's overall academic performance.	PO 1 to PO 12	VIII Semester of every B.Tech Program
Direct	Major Project	To test student's concepts in design, creative thinking and independent analysis. Three project reviews are conducted	Continuous assessment is carried by the Project review committee. First review emphasizes on Literature survey and problem identification, second review on Design methodology and the third review on validation of the model and documentation. The external examiner assessment is considered as another assessment tool for project work. Final CO attainment is calculated from these two assessments.	PO 1 to PO 12	Three project reviews in Final Semister.

Indirect	Alumni Survey	This survey gives the opinion of the student on the attainment of course outcomes.	At the end of the programme Alumni survey is collected from Alumni an Considered for the PO attainment under Indirect assessment.	PO 1 to PO 12	At the end of each course
Indirect	Graduate Exit Survey	This survey gives the opinion of the graduate on the attainment of Programme outcomes.	At the end of the programme, graduate exit survey is collected from the graduates and considered for the PO unde attainment r indirect assessment.	PO 1 to PO 12	At the end of the program

(iii) Quality/Relevance of Assessment Process:

Theory:

Internal Mid Tests: Internal tests serve to encourage students to keep up with course content covered in class. Two written examinations are conducted and its average marks are considered. For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of one objective paper, one essay paper and one assignment. The objective paper and the essay paper shall be for 10 marks each with a total duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for essay paper). The Objective paper is set with 20 bits of multiple choice, fillin the blanks and matching type of questions for a total of 10 marks. The essay paper shall contain 4 full questions (one from each unit) out of which, the student has to answer 2 questions, each carrying 5 marks. While the first mid-term examination shall be conducted on 1 to 2.5 units of the syllabus, the second mid-term examination shall be conducted on 2.5 to 5 units. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned). The first Assignment should be submitted

before the conduct of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. The total marks secured by the student in each mid-term examination are evaluated for 25 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate. The questions in the internal examinations and assignment sheets are mapped against COs of respective course. The questions for two internal examinations and Assignments are framed in such a way to cover all Course Outcomes.

The questions are framed in such a way that it should satisfy Bloom's Taxonomy, wherein each question is mapped to the appropriate course outcome of the respective course, which is evaluated based on the set attainment levels by the department.

University examination: These end-semester examinations are of 3-hour duration and cover the entire syllabus of the course. It would generally satisfy all course outcomes for a particular course. The COs are evaluated based on the set attainment levels.

Practical Subjects:

Daily Performance: Lab courses provide students first-hand experience with course concepts and the opportunity to explore methods used in their discipline. All the students are expected to be regular and learn the practical aspects of the subject and develop the necessary skills to become professionals. In order to facilitate interaction among the students and to develop team spirit, the students are expected to carry out experiments in groups. Performance assessment is based on the ability of the student to actively participate in the successful conduct of prescribed practical work and draw appropriate conclusions. The student submits a record of practical work performed in each lab session.

For practical subjects there shall be a continuous evaluation during a semester for 25 sessional marks and 50 end semester examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned.

University examination: The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the examination branch of the University.

These end-semester examinations are of 3- hour duration and cover the entire syllabus of the course. It would generally satisfy all course outcomes for a particular course. The COs are evaluated based on the set attainment levels.

Design/ Drawing: For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

Mini-Project:

There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV year II Semester. The industry

oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.

Seminar

There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for the seminar. The committee evaluates seminar based on following parameters.

Assessment Tool	
Internal Assessment	Presentation
	Viva-voce
	Report

Presentation: The content, quality of the presentation and communication skill is assessed by the evaluation committee.

Viva-voce: At the end of the presentation, the assessment panel and the student audience ask questions and seek clarifications on specific issues related to the seminar. The effectiveness of the student's response to these queries is assessed.

Report: A bona fide report on seminar is submitted at the end of the semester. This report shall include, in addition to the presentation materials, all relevant supplementary materials along with detailed answers to all the questions asked/clarifications sought during presentation. All references must be given toward the end of the report. A students' ability to comprehend and write effective reports and design documentation is assessed by evaluating the report.

Comprehensive Viva:

There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is intended to assess the student's understanding of the subjects he studied during the B. Tech. course of study. This is also to see the articulation of what is being learnt by them. The idea is to see that students are able to digest what is being taught in two full year and see their relevance not only in the practical field but also their inter relationship. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

Major Project:

Major Project is intended to be a challenge to the intellectual and innovative abilities of students. It gives students the opportunity to synthesize and apply the knowledge and analytical skills learned in the different disciplines.

Out of a total of 200 marks for the project work, 50 marks shall be allotted for Internal Evaluation and 150 marks for the End Semester Examination (Viva Voce). The End Semester Examination of the project work shall be conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the

project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of her project.Project will enable student to think innovatively on the development of components, products, processes or technologies in the field of Electronics and Communication. Students are expected to

- Perform an in depth study of the topic assigned in light of the preliminary report prepared in the seventh semester.
- Review and finalise the approach to the problem.
- Prepare a detailed action plan for conducting the investigation, including team work.
- Perform detailed analysis/ modelling/ simulation/ design/ problem solving/ experiment as needed.
- Develop a final product/ process, perform testing, arrive at results & conclusions and suggest future directions.
- Prepare a paper for Conference presentation/ publication, if possible.
- Prepare a report in the standard format for being evaluated by the Internal project Review Committee.

Assessment tools used to evaluate project work are:

Assessment Tool		**Evaluator**
Internal Assessment	Seminar on project	Internal project Review Committee
External Assessment	Final Report	University
	Presentation and Viva - Voce	University

Process for assessing the quality of Projects:

The Internal project Review Committee and the project guide together will analyze the nature of the project and make sure that the work is environment friendly, ensures safety, ethics and cost effective. The projects are classified into different streams and their relevance to PO's and PSO's are identified to ensure its quality.

(iv) Attainment Levels:

Course outcomes of all courses are assessed with the help of above mentioned assessment tools and attainment level is evaluated based on set attainment rubrics as per table 9.2.If the average attainment of a particular course for two consecutive years is greater than 80% of the maximum attainment value (i.e. 80% of 3 = 2.4), then for that particular course the current rubrics for attainment must be changed to analyse continuous improvement.

Table 9.2. Attainment Levels of COs

Assessment Methods	Attainment Levels	
Internal Assessment	Level 1	60% of students scoring more than 40% marks in internal assessment tools
	Level 2	70% of students scoring more than 40% marks in internal assessment tools
	Level 3	75% of students scoring more than 40% marks in internal assessment tools

University Assessment	**Level 1**	60% of students scoring more than 40% marks in university examination.
	Level 2	70% of students scoring more than 40% marks in university examination.
	Level 3	75% of students scoring more than 40% marks in university examination.

9.2 Validation of CO-PO mapping

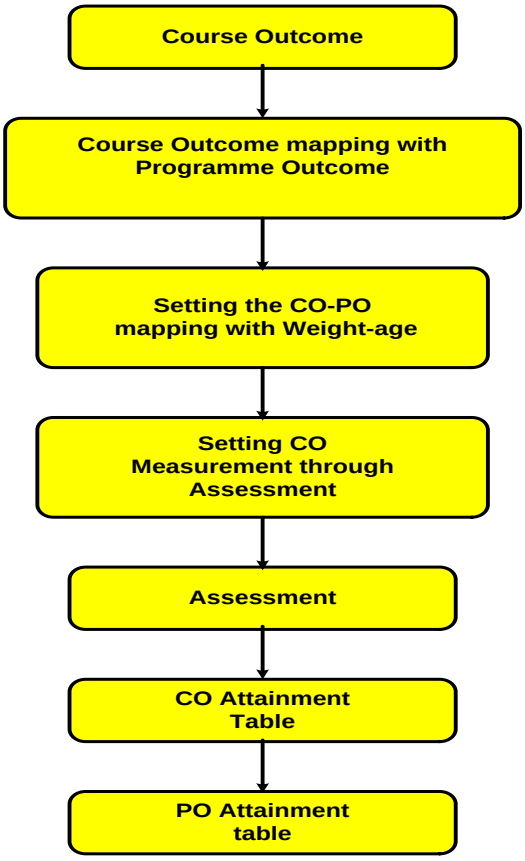


Figure 9.1: The process of CO-PO mapping validation

The process of CO-PO mapping validation is given in figure 9.1 and is explained as below:

Step 1 : Obtain course outcome.

Step 2 : Mapping of course outcome with program outcome.

Step 3 : Setting weightage for CO assessment.

Step 4 : CO measurement through assessment.

Step 5 : Obtain CO attainment table through direct and indirect assessment methods.

Step 6 : Obtain PO attainment table through direct and indirect assessment methods.

Assessment and Attainment methods

Assessment is one or more processes which is carried out by the institution, that identify, collect and prepare data to evaluate the achievement of course outcomes and program outcomes. Attainment is the action or fact of achieving a standard result towards accomplishment of desired goals. Primarily attainment is the standard of academic attainment as observed by test and/or examination result. Assessment methods are categorized into two as direct method and indirect method to access CO's and PO's. The direct methods display the student's knowledge and skills from their performance in the continuous internal assessment tests, semester examinations and supporting activities such as seminars, assignments, case study, group discussion, online quiz, mini project etc., These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning. The indirect method done through surveys and interviews, it asks the stakeholders to reflect their views on student's learning. The institute assesses opinions or thoughts about graduate's knowledge or skills by different stakeholders.

CO assessment methods are employed

- Direct assessment method and indirect assessment method are considered for 80% and 20% weightages respectively.

- Internal test assessment and end semester examination assessment are considered with the weightage of 20% and 80% respectively for the direct assessment of CO.

9.3 Procedure for Attainment of Program Outcomes

At the end of the each programme, the PO/PSO assessment is done from the CO attainment of all curriculum components. As per NBA guidelines, program can appropriately define the attainment level. The attainment level may be set by the particular program or commonly by the institution. The attainment can be made as best the choice by the institution or the program by analyzing the students knowledge. This can be achieved by using different supporting activities. This attainment is mainly for the purpose of making an esteemed engineer with good analytical, practical and theoretical knowledge about the program by attaining the PEO's and PSO's of the program and the institution. For the evaluation and assessment of CO's and PO's, rubrics are used. The rubrics considered here are given below:

Attainment Level 1: 60% of students score more than 40% marks out of the maximum relevant marks. Attainment Level 2: 70% of students score more than 40% marks out of the maximum relevant marks. Attainment Level 3: 75% of students score more than 40% marks out of the maximum relevant marks.

Assessment Methods	Attainment Levels	
Internal Assessment	Level 1	60% of students scoring more than 40% marks in internal assessment tools
	Level 2	70% of students scoring more than 40% marks in internal assessment tools
	Level 3	75% of students scoring more than 40% marks in internal assessment tools

Assessment Methods	Attainment Levels	
University (External) Assessment	Level 1	60% of students scoring more than 40% marks in internal assessment tools
	Level 2	70% of students scoring more than 40% marks in internal assessment tools
	Level 3	75% of students scoring more than 40% marks in internal assessment tools

9.4 CO Attainment Calculation of a Course:

Overall CO attainment of a course must be prepared as shown below

Mapping of Course outcome with Program Outcomes

CO-PO MATRIX FOR **ELECTRONIC DEVICES AND CIRCUITS(1804PC01)**

Course Outcome EDC(1804PC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2		3	3									
CO3			3	3								
CO4				3	2				2	2		2

CO ATTAINMENT			
CO	IA-1	IA-2 (In Percentage)	AVERAGE OF CORRESPONDING
C0-1	84		84
CO-2	84		84
CO-3		82	82
CO-4		82	82
C0-5		82	82
		ATTAINMENT PERCENTAGE	82.8
INTERNAL ATTAINMENT VALUE			3
UNIVERSITY/EXTERNAL ATTAINMENT VALUE			3
OVERALL DIRECT CO ATTAINMENT			3
INDIRECT CO ATTAINMENT			2.17
OVERALL CO ATTAINMENT			2.834

CO-PO attainment of the course ELECTRONIC DEVICES AND CIRCUITS(1804PC01)

Course Outcome EDC(1804PC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.834											
CO2		2.834	2.834									
CO3			2.834	2.834								
CO4				2.834	1.89				1.89	1.89		1.89
Average CO(EDC)	2.834	2.834	2.834	2.834	1.89				1.89	1.89		1.89

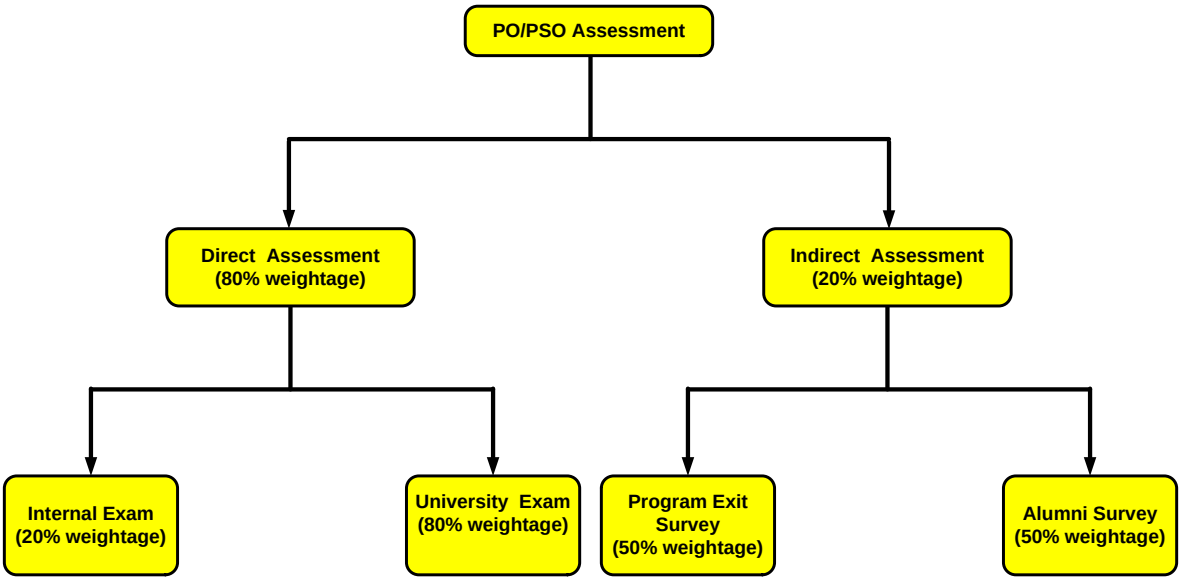
Figure 9.2. Direct attainment of CO-PO of ELECTRONIC DEVICES AND CIRCUITS(1804PC01)

Internal attainment of each COs of EDC (**1804PC01)** is the average of attainments obtained using various internal assessment tools. University exam covers the entire syllabus of a course and hence it is useful to measure the attainment of all COs related to a course. The total attainment is the sum of 20% of internal attainment and 80% of university attainment.

- **Internal Attainment is the average of attainments obtained using various internal assessment tools.**
- **Total Attainment =20% internal attainment + 80% university attainment**

10. ASSESSMENT PROCESS FOR OVERALL PO AND PSO ATTAINMENT

10.1 PO and PSO Assessment Process



PO/PSO assessment is done by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Direct assessment is based on CO attainment, where 80% weightage is given to attainment through university exam and 20% weightage is given to attainment through internal assessments. Indirect assessment is done through Graduate exit survey and alumni survey where Graduate exit survey and alumni survey is given a weightage of 50% each.

10.2 PO and PSO Assessment Tools

The various direct and indirect assessment tools used to evaluate POs & PSOs and the frequency with which the assessment processes are carried out are listed in table 10.1.

Table 10.1 Assessment tools used for evaluation of PO and PSO attainment

PO, PSO ASSESSMENT TOOLS					
		Course Type	**Assessment Tools**		**Minimum Frequency**
Direct (80% weightage)	**CO Assessment**	**Theory**	Internal Evaluation	Internal mid Tests	Twice per course
				Assignments	Twice per course
			University Exam		Once per course
		Practical	Internal Evaluation	Daily	Every lab
				Internal Lab exam	Once per course
			University Exam		Once per
		English Communication Skills	Internal Evaluation	Group Discussion	Once per course
				Presentation Skill	Once per course
				Writing skill	Once per course
			University Exam		Once per course
		Mini project	Internal Evaluation - Reviews		One per course
			University Viva voce		Once per course
		Comprehensive Viva	Internal Evaluation		Once per course
		Seminar	Presentation		Once per course

		Major Project	seminars	Twice per course
			External Viva voce	Once per
			Report	Once per
Indirect 20% Weightage	**Surveys**	Graduate Exit Survey		At the end of the Program
		Alumni Survey		Once per year

10.3 Quality / relevance of assessment tools and processes:

(I) Direct Assessment Tools and Process:

Direct assessment tools described in section 9.1 are used for the direct assessment of POs and PSOs. Initially, the attainment of each course outcome is determined using internal as well as external (university exam) assessment as described in section 7.2. The each PO attainment of corresponding to a particular course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values. Similarly, the values of PSO attainment are also determined.

Figure 10.1 shows the direct assessment of POs of **ELECTRONIC DEVICES AND CIRCUITS (1804PC01)** as a sample.

10.4 Direct Attainment

Figure 10.1 shows the direct assessment of POs of ELECTRONIC DEVICES AND CIRCUITS (1804PC01) as a sample.

Mapping of Course outcome with Program Outcomes

CO-PO MATRIX FOR **ELECTRONIC DEVICES AND CIRCUITS(1804PC01)**

Course Outcome EDC(1804PC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2		3	3									
CO3			3	3								
CO4				3	2				2	2		2

CO ATTAINMENT			
CO	IA-1	IA-2 (In Percentage)	AVERAGE OF CORRESPONDING
C0-1	84		84
CO-2	84		84
CO-3		82	82
CO-4		82	82
C0-5		82	82
		ATTAINMENT PERCENTAGE	82.8
INTERNAL ATTAINMENT VALUE			3
UNIVERSITY/EXTERNAL ATTAINMENT VALUE			3
OVERALL DIRECT CO ATTAINMENT			3
INDIRECT CO ATTAINMENT			2.17
OVERALL CO ATTAINMENT			2.834

CO-PO attainment of the course ELECTRONIC DEVICES AND CIRCUITS(1804PC01)

Course Outcome EDC(1804PC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.834											
CO2		2.834	2.834									
CO3			2.834	2.834								

CO4				2.834	1.89				1.89	1.89		1.89
Average CO(EDC)	2.834	2.834	2.834	2.834	1.89				1.89	1.89		1.89

Figure 10.1. Direct attainment of CO-PO of ELECTRONIC DEVICES AND CIRCUITS(1804PC01)

Average of direct attainments of PO_i obtained for all Courses:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct Attainment	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}

Direct Attainment D_i = Average of direct attainments of PO_i obtained for all Courses.

YR/SEM	SUBJECT NAME	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
FIRST YEAR	MATHEMATICAL METHODS	A10003	3.0	3.0	1.5	2.0	-	-	-	-	-	-	-	1.0	2.0		
	MATHEMATICS – I	A10002	3.0	3.0	-	2.0	-	-	-	-	-	-	-	1.0	3.0		
	ENGINEERING PHYSICS	A10004	3.0	2.2	2.3	-	-	-	-	2.0	2.0	-	-	2.0	3.0	2.0	
	ENGINEERING PHYSICS/ ENGINEERING CHEMISTRY LAB	A10081	2.0	2.0	3.0	-	-	-	-	-	2.0	2.0	-	2.0	1.0		
	ENGINEERING CHEMISTRY	A10005	3.0	2.0	2.0	2.7	1.0	2.0	2.0	-	2.0		2.0	3.0	1.0	2.0	
	ENGLISH	A10001	-	-	-	-	-	2.3	-	3.0	3.0	3.0		3.0		2.0	3.0
	ENGINEERING DRAWING	A10301	3.0	3.0	1.0	3.0	1.0	-	-	-	-	3.0	1.0	1.0	3.0		
	ENGINEERING WORKSHOP	A10082	2.5	2.5	1.5	1.0	1.0	1.0	-	-	-	-	-	1.0	2.0	1.0	
	COMPUTER PROGRAMMING	A10501	2.8	2.0	-	2.7	-	-	3.0	-	2.7	3.0	2.5	2.2	2.0		
III YEAR I SEMESTER	ANALOG COMMUNICATIONS LAB	A50487	3.0	3.0	2.67		-	-	-	-	-	-	-	-	3.0		
	ANALOG COMMUNICATIONS	A50408	3.0	3.0	3	2.4	-	-	-	-	-	-	-	-	3.0		
	ANTENNAS & WAVE PROPAGATION	A50418	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	-	-	3.0		
	COMPUTER ORGAN. AND OPERATING SYSTEMS	A50516	3.0	2.9	2.7	2.7		-	-	2.5	-	2.8	3.0	2.9	1.0		
	CONTROL SYSTEMS ENGINEERING	A50217	3.0	3.0	2.9	2.7	3.0	-	-	2.5	-	2.8	3.0	2.9	1.0		
	ELECTRONIC MEASUREMENTS & INSTRUMENTATION	A50422	3.0	2.8	2.8	2.4		-	-	2.5	-	2.7	3.0	2.8	2.0		
	IC APPLICATIONS AND HDL SIMULATION LAB	A50488	3.0	2.9	2.8	2.6	3.0	-	-	2.5	-	2.8	3.0	2.9	3.0		
	LINEAR AND DIGITAL IC APPLICATIONS	A50425	3.0	2.9	2.8	2.6	3.0	-	-	2.5	-	2.8	3.0	2.9	3.0		
III YEAR II SEMESTER	DIGITAL COMMUNICATIONS	A60420	3.0	2.5	2.0	2.5	2.0	-	2.0	-	-	3.0	-	2.0	3.0		
	DIGITAL SIGNAL PROCESSING LAB	A60493	3.0	3.0	3	2.0	2.0	-	-	-	-	-	-	-	3.0		
	DIGITAL SIGNAL PROCESSING	A60421	2.5	2.75	2.25	2.8		-	-	-	-	-	-	-	3.0		
	INTELLECTUAL PROPERTY RIGHTS	A60017	-	-	-	-	-	3.0	-	3.0	-	2.67	2.5	3.0		3.0	3.0
	MENAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	A60010	3.0	3.0	3.0	3.0	3.0	-	2.0	-	-	2.8	2.5	2.2		3.0	3.0

	MICROPROCESSOR AND MICROCONTROLLER	A60494	3.0	3.0	2.67	3.0	-	-	-	-	-	3.0		3.0	3.0		
	MICROPROCESSOR AND CONTROLLER LAB	A70086	-	-	-	-	-	-	-	2.5	-	2.67	3.0	2.67	3.0		
	VLSI DESIGN	A60432	3.0	2.8	2.8	2.4	-	-	-	-	-	-	-	3.0	3.0		
IV YEAR ISEMESTER	CELLULAR AND MOBILE COMMUNICATIONS	A70434	2.8	2.8	2.6	2.6	2.0	-	3.0	-	-	2.7	-	2.6	3.0		
	COMPUTER NETWORKS	A70515	2.2	2.0	3.0	2.5	2.0	-	-	-	-	-	-	2.0	3.0		
	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	A70505	2.7	2.5	2.5	2.5	3.0	-	-	-	-	-	-	3.0	1.0		
	MANAGEMENT SCIENCE	A70014	2.7	3.0	2.5	3.0	-	-	-	2.0	3.0	2.7	2.8	2.6		3.0	3.0
	MICROWAVE ENGINEERING	A70442	2.6	2.2	2.3	3.0	2.0	-	-	-	-	2.0	2.0	2.5	3.0		
	OPTICAL COMMUNICATION	A70444	3.0	2.3	2.5	2.5	2.0	-	-	-	2.0	2.0	-	2.0	2.0		
	ADVANCED COMMUNICATION SKILLS LAB LAB	A70086	-	-	-	-	-	-	-	2.5	-	2.7	3.0	2.7		2.0	3.0
	MICROWAVE AND DIGITAL COMMUNICATIONS LAB	A70499	3.0	3.0	3.0	3.0	2.5	-	-	2.7	-	2.7	-	2.5	3.0		
IV YEAR II SEMESTER	RS	A80450	3.0	2.7	3.0	2.5	2.0	-	-	-	2.0	2.0	2.0	2.0	3.0		
	SC	A80450	3.0	3.0	3.0	3.0	-	-	-	-	2.5	2.5	2.0	2.5	3.0		
	WCN	A80454	3.0	3.0	2.0	3.0	2.0	3.0	1.0	-	2.0	2.0	-	2.0	3.0		
	COMPREHENSIVE VIVA	A80090	3.0	3.0	-	-	-	-	-	-	-	2.0	-	-		2.0	2.0
	MAJOR PROJECT	A80088	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	-	2.0		3.0	3.0
	INDUSTRY ORIENTED MINI PROJECT	A80087	3.0	3.0	3.0	3.0	3.0	-	-	-	-	-	-	-		3.0	3.0
	SEMINAR	A80089	3.0	3.0	3.0	3.0	3.0	-	-	-	-	3.0	-	-		2.0	3.0
		AVERAGE	2.9	2.7	2.6	2.6	2.3	2.3	2.2	2.5	2.3	2.6	2.5	2.3	2.5	2.3	2.9
		% AVERAGE (AVERAGE *100/3)	96.08	91.38	85.9	87.5	77	75.5	72.2	83.8	77.2	86.9	83.85	77.9	83.9	77.8	96.3
		% AVERAGE (AVERAGE *100/3) ROUND TWO DECIMAL PLACES	96.08	91.4	85.9	88	77	75.5	72.2	84	77	86.9	83.9	77.9	84	77.8	96.3

POs	PO 1	PO 2	PO 3	PO4	PO5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO 12	PS O1	PS O2	PSO3
Direct Attainment	2.9	2.7	2.6	2.6	2.3	2.3	2.2	2.5	2.3	2.6	2.5	2.3	2.5	2.3	2.9

10.5 Indirect Assessment Tools and Process:

Indirect assessment is done through program exit survey, alumni survey and employer survey where program exit survey and employer survey are given a weightage of 25% each and alumni survey is given a weightage of 50%.

1. Graduate Exit Survey:

A exit survey is conducted for students who have graduated out of the department

for that year. Relevant questionnaire in exit survey form to evaluate attainment of POs and PSOs is given in section (a) and relation of POs & PSOs with questionnaire is given in section (b).

(i) Questionnaire Format

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5.Excellent 4. Very Good 3. Good 2.Average 1.Poor

S.No	Criteria	Rating
1	Opinion about UG programme in ECE at MRECW.	
2	Ability acquired to apply knowledge of Mathematics, Science and Engineering in real time.	
3	Competence developed to analyse and interpret data and design complex computing system or process specific needs.	
4	Skill gained to apply modern engineering tools and techniques for engineering practice.	
5	Responsibility level acquired to develop engineering solutions for sustainable development, ethically and economically.	
6	Leadership qualities and team spirit inculcated through various student development programmes.	
7	Zeal to engage in, to resolve contemporary issues and acquire lifelong learning.	
8	Overall rating for MRECW	

(ii) Relation of POs and PSOs with questionnaire

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Questions	Q3	Q3	Q3,Q4	Q4,Q5	Q5	Q6,Q9	Q6	Q6	Q7	Q7	Q5,Q7	Q6,Q8

PSOs	PSO1	PSO2	PSO3
Questions	Q3	Q5,Q6,Q8	Q6,Q7

(iii) Evaluation Process

The questionnaire consists of 8 questions which is relevant for assessing each PO and PSO. Each question is having 5 options namely Excellent, Very Good, Good, Average and Poor, which is given marks 5,4,3,2,1 respectively. These survey results are tabulated and the average values corresponding to each PO and PSO are determined.

2. Alumni Survey:

Feedback is taken from alumni. Relevant questionnaire in alumni survey form to evaluate attainment of POs and PSOs is given in section (i) and relation of POs & PSOs with questionnaire is given in section (ii).

(i) Questionnaire Format

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5.Excellent 4. Very Good 3. Good 2.Average 1.Poor

S.No	Criteria	Rating
1	Extent of curriculum meeting the industry needs.	
2	Your ability to apply knowledge and design electronic system or process to meet desired specifications and needs.	
3	Benefit from value added certifications, workshops and training programmes conducted during your course.	
4	Your ability to use techniques, skills and modern engineering tools necessary for engineering practice.	
5	Benefit from communication skills, presentation skills and leadership qualities gained from the co-curricular and extracurricular activities.	
6	Your ability to engage in, to resolve contemporary issues and acquire lifelong learning.	
7	Competence to function on multidisciplinary teams	
8	Skills attained to create, select and apply appropriate techniques, resources and modern engineering and IT tools.	
9	Extent of Ethical, social and environmental values inculcated, helping you to relate Electronics and Communication engineering issues with societal needs.	

(ii) Relation of POs and PSOs with questionnaire:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Questions	Q3	Q3,Q5	Q3	Q5	Q5	Q5,Q10	Q8,Q10	Q10	Q8	Q6	Q5,Q6,Q8	Q7

PSOs	PSO1	PSO2	PSO3
Questions	Q3,Q4,Q5	Q5,Q7,Q10	Q6,Q8,Q9,Q10

(iii) Evaluation Process

The questionnaire consists of 9 questions which is relevant for assessing each PO and PSO. Each question is having 5 options namely Excellent, Very Good, Good, Average and Poor, which is given marks 5,4,3,2,1 respectively. These marks are tabulated and the average values corresponding to each PO and PSO are determined.

10.6 Indirect Attainment

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Graduate Exit Survey	Attainment values of Graduate Exit Survey											
Alumni Survey	Attainment values of Alumni Survey											
Overall Attainment	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}	I_{11}	I_{12}

- **Indirect Attainment I_i= 50% attainment of Graduate Exit survey + 50% attainment of Alumni survey**

10.7 Overall PO and PSO attainment

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct Attainment	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}
Indirect Attainment	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}	I_{11}	I_{12}
Overall Attainment	O_1	O_2	O_3	O_4	O_5	O_6	O_7	O_8	O_9	O_{10}	O_{11}	O_{12}

Overall Attainment of PO_i; $O_i = 80\%$ of D_i + 20% of I_i

where D_i – Direct Attainment of each PO
I_i – Indirect Attainment of each PO

Similarly PSO attainment is also evaluated.

POs	PSO1	PSO2	PSO3
Direct Attainment	D_1	D_2	D_3
Indirect Attainment	I_1	I_2	I_3
Overall Attainment	O_1	O_2	O_3

Overall Attainment of PSO_i; $O_i = 80\%$ of D_i + 20% of I_i

where D_i – Direct Attainment of each PSO
I_i – Indirect Attainment of each PSO

11 ASSESSMENT PROCESS OF THE ATTAINMENT OF PROGRAMME EDUCATIONAL OBJECTIVES

11.1 The Administrative System ensuring the Attainment of the PEO's

The following administrative setup is put in place to ensure the attainment of PEOs

- Program Coordinator
- Program Assessment Committee
- Department Advisory Board

Program Coordinator:

- ❖ Interacts and maintains liaison with key stake holders, students, faculty, Department, Head, and Employer.
- ❖ Monitor and reviews the activities of each year in program (II, III,IV) independently with course coordinators.
- ❖ Schedules program work plan in accordance with specifications of PEOs and Pos.
- ❖ Oversees daily operation and coordinates activities of program with appropriate policies, procedures and specifications given by HOD.
- ❖ Coordinates and supervise the faculty teaching the particular course in the module.
- ❖ Responsible for assessment of the course objectives and outcomes.
- ❖ Recommend and facilitate workshops, faculty development programs, meetings or conferences to meet the course outcomes.
- ❖ Analyzes results of Particular course and recommends the Program coordinator and/or Head of the Department to take appropriate action.

- Liaise with students, faculty, program coordinator and Head of the Department to determine priorities and policies.

Program Assessment Committee:

- Program assessment committee consists of program coordinator and faculty representatives
- Chaired by program Coordinator, the committee monitors the attainment of PO and PEOs
- Evaluates program effectiveness and proposes necessary changes
- Prepares periodic reports records on program activities, progress, status or to other special reports for management of key stake holders
- Motivates the faculty and students towards attending workshops, developing projects, working models, paper publications and research
- Interact with students , faculty , program coordinators, Module Coordinator and outside/Community agencies (through their representation) in facilitating PEO's
- PAC meets at least once in 6 months to review the program and submits report of Department Advisory Board.

Department Advisory Board:

The Departmental Advisory Board (DAB) has been formed with the objective of remaining up to date with the latest requirements of the industry and incorporating necessary components in the curriculum as much as possible.

The DAB is enriched with members from eminent institutions as well as senior members of faculty who periodically monitor the departmental

activities and suggest improvements of the program.

It is highest decision making body at the department level.

- ❖ DAB chaired by HOD, receives the report of the PAC and monitors the progress of the program
- ❖ DAB on current and future issues related to programs
- ❖ Develops and recommends new or revised program goals and objectives
- ❖ DAB meets at least once in a year to review the programs

List of Committees and their Contribution for ensuring the achievement of PEO's

S.NO	Committee Name	Name of the Faculty members	Functions	PEO's
1	Industry Institute Interaction & Industrial Visits committee	Prof. S. BabuRao Dr. vasanthan Dr TRV Ananda Rajan	To schedule and conduct regular visits to industries in the vicinity and other states	PEO-2 PEO-3
2	Project Review Committee	Dr.N.Sreekanth Dr. Trv Anandharajan Dr. U.Satheeshwaran Dr. S. Rajkumar Dr .S.Sathish	To allot projects to the group of students regularly monitor the progress and evaluate the quality of projects	PEO-2
3	Technical Fests organizing committee	Dr. S. Vasantha Swaminathan Dr.L.Malliga Mrs. K Sumalatha	To conduct various technical events on emerging trends from time to time	PEO-2 PEO-4
4	Guest Lectures organizing Committee	Mrs. M sruthi Mrs. V purnima Mrs. Kavitha	To contact various reputed persons from R&D and Industries for arranging guest lecturers for the benefit of the students and faculty	PEO-2 PEO-3
5	Technical Skills enhancement Training Committee	Dr.N.Sreekanth Dr. Trv Anandharajan Prof. S. BabuRao Dr.L.Malliga	To train and prepare the students for placement	PEO-1 PEO-2 PEO-4 PEO-5
6	Student Mentoring Committee	Dr.N.SreekanthMs. V. Dr.L.Malliga	To solve problems faced by the students	PEO-1 PEO-2

		Mrs. K. Anusha		PEO-3 PEO-4
7	Consultancy and R&D Advisory Committee	Dr.N.SreekanthProf. K. Dr. Trv Anandharajan Dr. S. Rajkumar Dr .S.Sathish	To guide and motivate faculty to apply various funded projects	PEO-3
8	Class Review Committee	Class teachers Course instructors	To monitor the progress of class work, syllabus coverage from time to time. To plan remedial classes for slow learners	PEO-1 PEO-2
9	Department Library Committee	Mrs. K Swetha Mrs. A Tejaswe	To monitor and update the library text books, maintaining the group, mini and major project Reports	PEO-1 PEO-4
10	Placements Co-ordination committee	Mr. G Harish Mr. K Ramakrishna	To design and update the curriculum which meet the current needs of the industry. Conducting the CRT classes, monitoring the students eligibility criteria	PEO-1 PEO-2 PEO-4 PEO-5
11	Alumni Affairs	Mrs . Amy prasanna Mrs . P Spandana	To contact and oversee the Alumni affairs like conducting special lectures by Alumni recruited in Industry	PEO-1 PEO-2 PEO-4
12	Comprehensive viva-voce Committee	Dr.L.Malliga Dr. S. Vasantha Swaminathan	Conducts the comprehensive viva-voce, verification and uploading the marks.	PEO-1 PEO-2 PEO-3 PEO-4 PEO-5

11.2 Tools and processes used in achievement of the PEOs

Describe The Assessment Process That Periodically Documents And Demonstrates The Degree To Which The Programme Educational Objectives Are Attained. Also Include Information On:

a) A listing and description of the assessment processes used to gather the data upon which the evaluation of each programme educational objective is based. Examples of data collection processes may include, but are not limited to, employer surveys, graduate surveys, focus groups, industrial advisory committee meetings, or other processes that are relevant and appropriate to the programme.

b) The frequency with which these assessment processes are carried out.

The curriculum is designed by taking into consideration various components prescribed by AICTE. All courses that are included under each of the following components enlisted below contribute to the achievement of PEOs. The course instruction, marks secured by the students in these components indicate the level of achievement of the PEOs. In addition, Graduate Exit survey, Alumni survey, Industrial advisory committee meetings, gainfully engaged/ Placements of students also contribute to the attainment of PEOs.

Table 11.1: Assessment Tools for PEOs

Type of Assessment Tool	**Assessment Tool**	**Assessment criteria**	**Data collection frequency**	**Responsible entity**	**Indicators for Attainment of PEO**
Direct	Results	Internal, External examination	Once in a semester	Examination Cell	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5
	Placement Record	Number of students Placed	Once every year	Placement cell	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5
	Higher Education	Number of students opted for higher education	Once every year	Department	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5
Indirect	Graduate Exit survey	Level of achievement	Once every Year	Department	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5
	Alumni Survey	Level of achievement	Once every Year	Department	PEO-1 PEO -2 PEO -3 PEO -4 PEO -5

11.3 The attainment of the PEOs

The Expected Level of Attainment for each of the Program Educational Objectives

Table 11.2: Levels of Attainment for each PEO

PEO	Level of Attainment
Value >=70%	Excellent
Value > = 60 and value < 70%	Very good
Value > = 50 and value < 60	Good
Value >= 40 and value < 50	Satisfactory
Value < 40	Not Satisfactory

PEO Evaluation Processes and an Analysis

For the purpose of assessing the levels of achievement of PEO's, certain weightages are given for various tools as indicated below.

Table 11.3: PEO Evaluation Criteria

S.No	Name of the Evaluation Criterion	Weightages in %
Direct Assessment (80%)		
1.	Direct Evaluation of Program Outcomes (POs) of the concerned PEO	60
2.	Placements	15
3.	Higher Studies	5
Indirect Assessment (20%)		
4.	Graduate Exit Survey	10
5.	Alumni Survey	10
Total		100

CO-PO attainment of the course ELECTRONIC DEVICES AND CIRCUITS(1804PC01)

Table : Direct attainment of CO-PO of ELECTRONIC DEVICES AND CIRCUITS(1804PC01)

Course Outcome EDC(1804PC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.834											
CO2		2.834	2.834									
CO3			2.834	2.834								
CO4				2.834	1.89				1.89	1.89		1.89
Average CO(EDC)	2.834	2.834	2.834	2.834	1.89				1.89	1.89		1.89
Average CO(EDC) (%)	94.4	94.4	94.4	94.4	63				63	63		63

Average of direct attainments of PO_i obtained for all Courses (2014-2018):

POs	PO1	PO2	PO 3	PO 4	PO5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO 2	PSO 3
Direct Attainment	2.9	2.7	2.6	2.6	2.3	2.3	2.2	2.5	2.3	2.6	2.5	2.3	2.5	2.3	2.9
(%) Direct Attainment	96.08	91.4	85.9	88	77	75.5	72.2	84	77	86.9	83.9	77.9	84	77.8	96.3

Direct Evaluation of Program Outcomes (POs) of the concerned PEO

Mapping of Program Outcomes (POs) of the concerned PEOs is shown in table 11.4.

Table 11.4 Mapping of Program Outcomes (POs) of the concerned PEOs

PEO / PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	X				
PO2		X	X		
PO3			X		
PO4		X	X		
PO5		X	X		
PO6				X	X
PO7				X	
PO8				X	X

PO9				X	
PO10				X	
PO11		X		X	X
PO12				X	X

Mapping of Program Outcomes (POs) of the concerned PEOs by using average of direct attainments of PO_i obtained for all Courses (2014-2018) is shown in table 11.5.

Table 11.4 Mapping of Program Outcomes (POs) of the concerned PEOs (2014-2018)

PEO / PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	90.96				
PO2		89.41	89.41		
PO3			85.61		
PO4		88	88		
PO5		77	77		
PO6				75.5	75.5
PO7				72.2	
PO8				84	84
PO9				77	
PO10				86.9	
PO11		83.9		83.9	83.9
PO12				77.9	77.9
AVG	**96.08**	**85.07**	**85.57**	**79.63**	**80.325**
AVG(PEOs) (%)	**84.1**				

% AVERAGE ACHIEVEMENT O F PEOs = 84.1%

Program Outcomes of the concerned PEO (%)	**96.08**	**85.07**	**85.57**	**79.63**	**80.325**

Table 11.5: Attainment of PEO's for 2014-18 Batch

S.no	Name of the Evaluation Criterion	PEO-1	PEO-2	PEO-3	PEO-4	PEO-5
1.	Program Outcomes of the concerned PEO (60%)	57.6	52.8	51.3	47.7	48.1
2.	Placements/ Higher Studies (20%)	15.5	15.5	15.5	15.5	15.5
3.	Graduate Exit Survey (10%)	9.8	9.7	9.6	9.5	9.8
4.	Alumni Survey (10%)	9.7	9.6	9.5	9.7	9.6
Total		**92.6**	**87.6**	**85.9**	**82.4**	**83**

List of comparison of PEOs attainment values with previous two year Graduation batches is shown in below table 11.6

Table 11.6: Indicating comparison of PEO attainment values

Graduation Batch	PEO-I	PEO-II	PEO-III	PEO-IV	PEO-V	Whether Expected level of PEO is achieved?
2012-2016	**85**	**77.24**	**76.53**	**80.7**	**78.45**	YES
2013-2017	**86.52**	**77.69**	**76.99**	**81.58**	**79**	YES
2014-2018	**92.6**	**87.6**	**85.9**	**82.4**	**83**	YES

11.4 Process of Redefining the PEOs

Outcome based education system was adopted by NBA in the beginning of 2011 and various departments of the college have started orienting their programmes accordingly. The initial drafts were presented to various stake holders and made suitable modifications and thus, the process of redefining has taken place and the second draft of PEOs was formulated. There were some modifications suggested by NBA from time to time as reflected in their website and further redefining was carried out.

As a regular academic activity, the college has always been involving the key stake holders in collecting information and suggestions with regard of curriculum development and curriculum revision. This practice was being followed even before the introduction of outcome based accreditation process by NBA. Based on the information collected the objectives of the program are defined, refined and are inscribed in the form of PEO's.

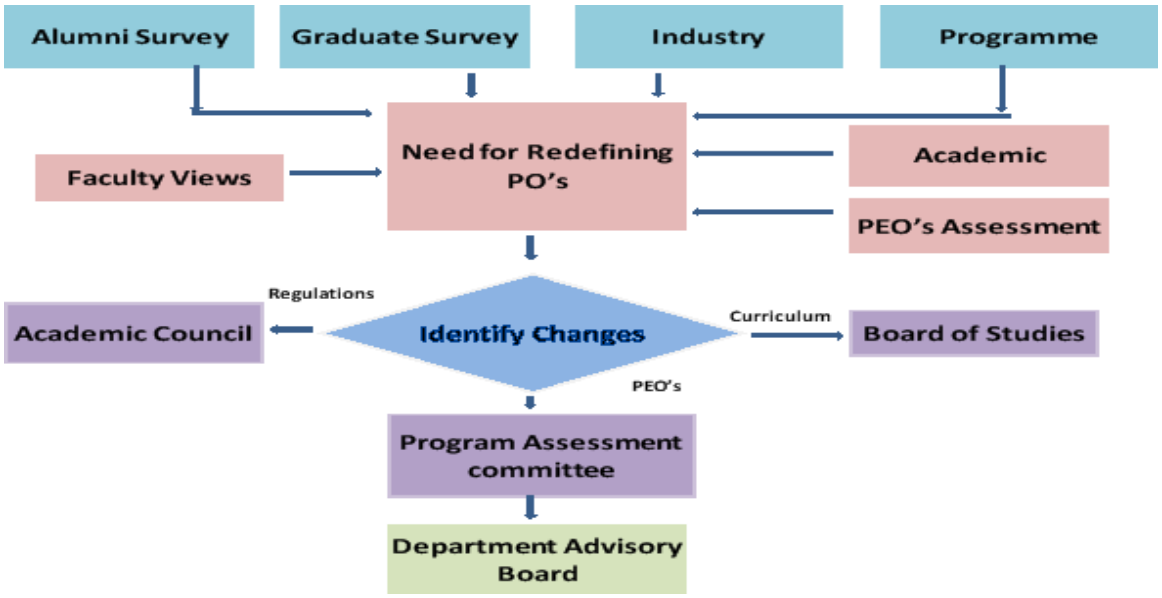


Figure 11.1: Flow chart for redefining PEO's

The following process is followed to redefine the PEOs as and when required.

- The process is initiated by Department Advisory Board during PEOs assessment and attainment process.
- To redefine, the existing PEOs assessment data is gathered through direct and indirect assessment methods.
- To improve the program performance, the collected data is analyzed to identify the need for redefining PEOs.
- Based on identified changes in terms of curriculum, regulations and PEOs, the administrative system like BOS, Academic Council and Program Assessment Committee involve appropriate actions.

In addition to the above, the following inputs are also taken into account in the process of redefining PEO's:

1. The level of attainment of PEO's defined earlier.
2. Suggestions/ experiences of experts from sister colleges and various organizations.
3. The information gathered during Accreditation awareness programs.

ANNEXURE

A. B.Tech COURSE LIST (2014-2018)

YR/SEM	SUBJECT NAME	Course Code
FIRST YEAR	MATHEMATICAL METHODS	A10003
	MATHEMATICS – I	A10002
	ENGINEERING PHYSICS	A10004
	ENGINEERING PHYSICS/ ENGINEERING CHEMISTRY LAB	A10081
	ENGINEERING CHEMISTRY	A10005
	ENGLISH	A10001
	ENGINEERING DRAWING	A10301
	ENGINEERING WORKSHOP	A10082
	COMPUTER PROGRAMMING	A10501
III YEAR I SEMESTER	ANALOG COMMUNICATIONS LAB	A50487
	ANALOG COMMUNICATIONS	A50408
	ANTENNAS & WAVE PROPAGATION	A50418
	COMPUTER ORGAN. AND OPERATING SYSTEMS	A50516
	CONTROL SYSTEMS ENGINEERING	A50217
	ELECTRONIC MEASUREMENTS & INSTRUMENTATION	A50422
	IC APPLICATIONS AND HDL SIMULATION LAB	A50488
	LINEAR AND DIGITAL IC APPLICATIONS	A50425
III YEAR II SEMESTER	DIGITAL COMMUNICATIONS	A60420
	DIGITAL SIGNAL PROCESSING LAB	A60493
	DIGITAL SIGNAL PROCESSING	A60421
	INTELLECTUAL PROPERTY RIGHTS	A60017
	MENAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	A60010
	MICROPROCESSOR AND MICROCONTROLLER	A60494
	MICROPROCESSOR AND CONTROLLER LAB	A70086
	VLSI DESIGN	A60432
IV YEAR ISEMESTER	CELLULAR AND MOBILE COMMUNICATIONS	A70434
	COMPUTER NETWORKS	A70515
	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	A70505
	MANAGEMENT SCIENCE	A70014
	MICROWAVE ENGINEERING	A70442

	OPTICAL COMMUNICATION	A70444
	ADVANCED COMMUNICATION SKILLS LAB LAB	A70086
	MICROWAVE AND DIGITAL COMMUNICATIONS LAB	A70499
IV YEAR II SEMESTER	RS	A80450
	SC	A80450
	WCN	A80454
	COMPREHENSIVE VIVA	A80090
	MAJOR PROJECT	A80088
	INDUSTRY ORIENTED MINI PROJECT	A80087
	SEMINAR	A80089

B. GRADUATE EXIT SURVEY FORM

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

Autonomous Institution, UGC, Govt. of India

Permanently Affiliated to JNTUH, Approved by AICTE, ISO 9001:2015 Certified Institution

Accredited by NBA & NAAC with 'A' Grade UGC, Govt.of India

NIRF Indian Ranking–2018, Accepted by MHRD, Govt. of India

AAA+ Rated by Careers 360 Magazine, National Ranking-Top 100 Rankband by Outlook, 7th Rank CSR, Platinum Rated-AICTE-CII Survey

Maisammaguda, Dhullapally, Secunderabad, Kompally-500100

Department of Electronics & Communications Engineering

Graduate Exit Survey

Academic Year:

Name(in Full): Roll No: Mail-id:

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5.Excellent 4. Very Good 3. Good 2.Average 1.Poor

S.No	Criteria	Rating
1	Opinion about UG programme in ECE at MRECW.	
2	Overall Rating for attainment of your PEOs & POs.	
3	Ability acquired to apply knowledge of Mathematics, Science and Engineering in real time.	
4	Competence developed to analyze and interpret data and design complex electronic system or process specific needs.	
5	Skill gained to apply modern engineering tools and techniques for engineering practice.	
6	Responsibility level acquired to develop engineering solutions for sustainable development, ethically and economically.	
7	Leadership qualities and team spirit inculcated through various student development programmes.	
8	Zeal to engage in, to resolve contemporary issues and acquire lifelong learning.	
9	Benefit from MRECW	

Signature

C. ALUMNI SURVEY FORM

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

Autonomous Institution, UGC, Govt. of India

Permanently Affiliated to JNTUH, Approved by AICTE, ISO 9001:2015 Certified Institution

Accredited by NBA & NAAC with 'A' Grade UGC, Govt.of India

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Maisammaguda, Dhullapally, Secunderabad, Kompally-500100

Department of Electronics & Communications Engineering

Alumni Survey Form **Academic Year:**

Name			
Specialization and Period of Graduation			
Address for Communication:			
City:	State:	Pin code	
Employment details:		Email:	
Company and Designation:			

Kindly rate the following criteria on a scale of 1-5. Your genuine response will be helpful for the continuous quality improvement of our UG programme in ECE.

5.Excellent **4. Very Good** **3. Good** **2.Average** **1.Poor**

S.No	Criteria	Rating
1	Overall Rating for attainment of your PEOs & Pos.	
2	Extent of curriculum meeting the industry needs.	
3	Your ability to apply knowledge and design computing system or process to meet desired specifications and needs.	
4	Benefit from value added certifications, workshops and training programmes conducted during your course.	
5	Your ability to use techniques, skills and modern engineering tools necessary for engineering practice in your organization.	
6	Benefit from communication skills, presentation skills and leadership qualities gained from the co-curricular and extracurricular activities in your career/higher education.	
7	Your ability to engage in, to resolve contemporary issues and acquire lifelong learning.	
8	Competence to function on multidisciplinary teams in your job.	
9	Benefit from skills attained to create, select and apply appropriate techniques, resources and modern engineering and IT tools to show professional efficiency.	
10	Extent of Ethical, social and environmental values inculcated, helping you to relate computer engineering issues with societal needs.	

Suggestions for Improvement:

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Signature