

CO - PO/PSO & PEO ASSESSMENT AND ATTAINMENT PROCESS MANUAL

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING **MALLA REDDY ENGINEERING COLLEGE FOR WOMEN** (Autonomous Institution-UGC, Govt. of India)

Accredited by NBA & NAAC with 'A' Grade

NIRF Indian Ranking, Accepted by MHRD, Govt. of India | Rank Band – Excellent by ARIIA, Accepted by MHRD, Govt. of India
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National Ranking-Top 100 Rank band by Outlook Magazine, Ranked as Top Engineering Colleges of Eminence in India – 2022 by CSR Rankings,
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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.

2.1 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.

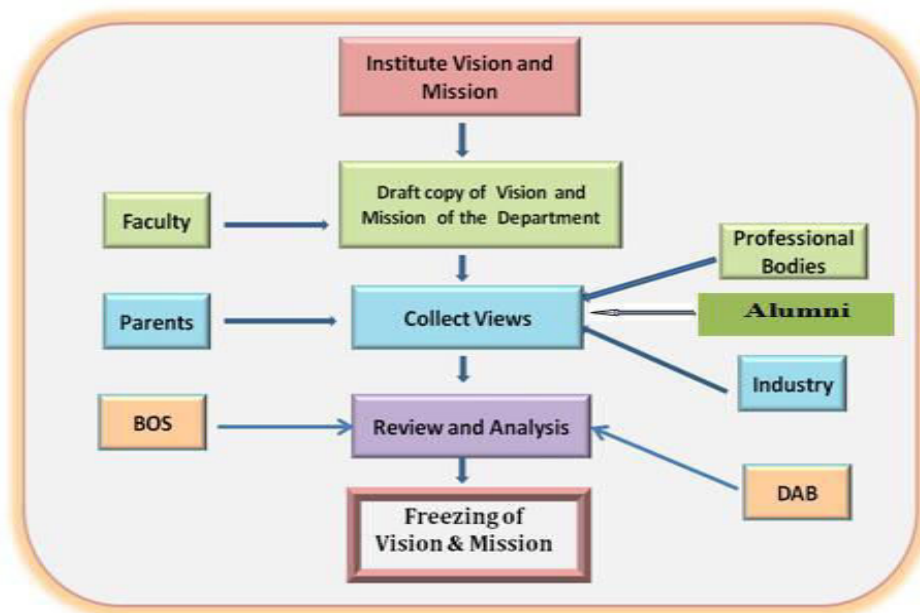


Figure 2.1 Process for defining Vision and Mission of the Department

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

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.

PROGRAM EDUCATIONAL OBJECTIVES

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, responsibility, 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.

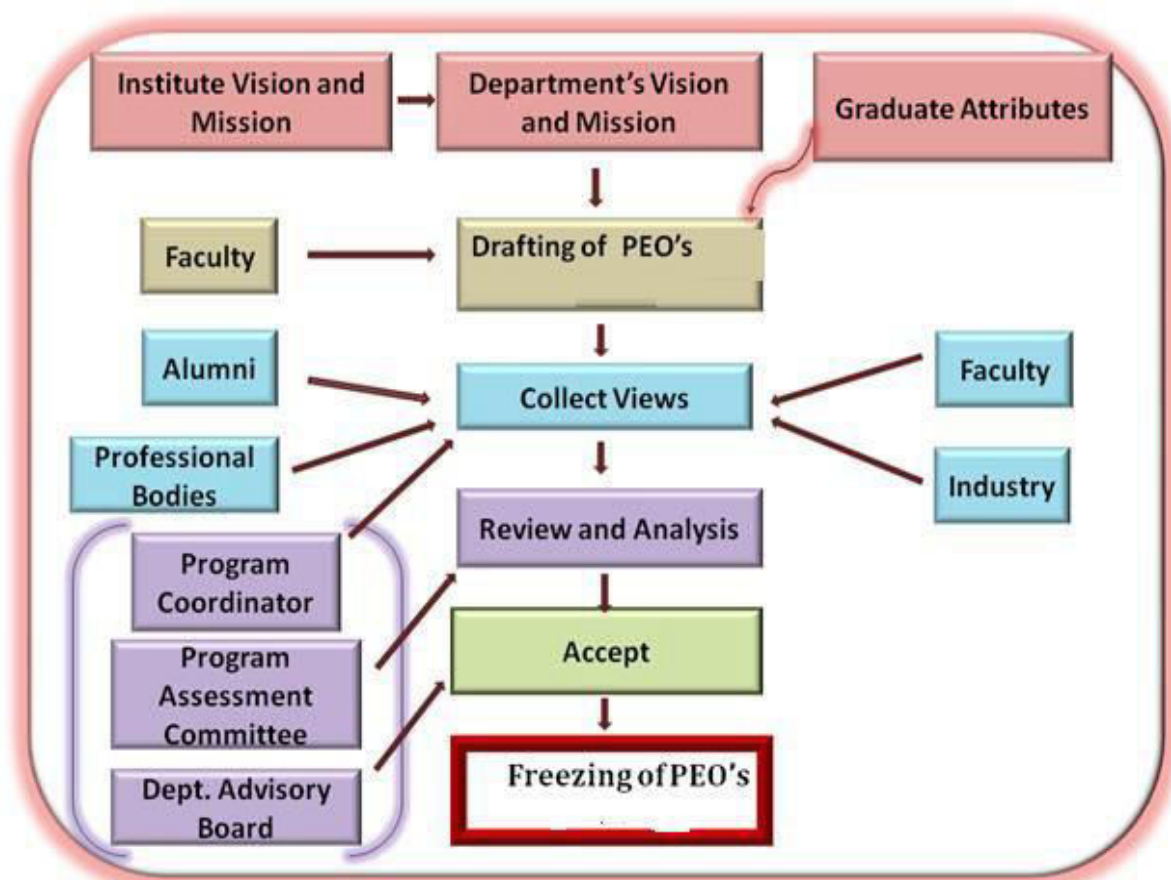


Figure3.1: Process to Define PEO's of the Department

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 3.1: PO publishing and dissemination

How Published	Where Published	How Disseminated
Incorporating in booklet given in orientation, syllabus book, course files and lab manuals	<ul style="list-style-type: none"> • Orientation booklet • syllabus books • Course files and lab manuals • Laboratories in the departments 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.

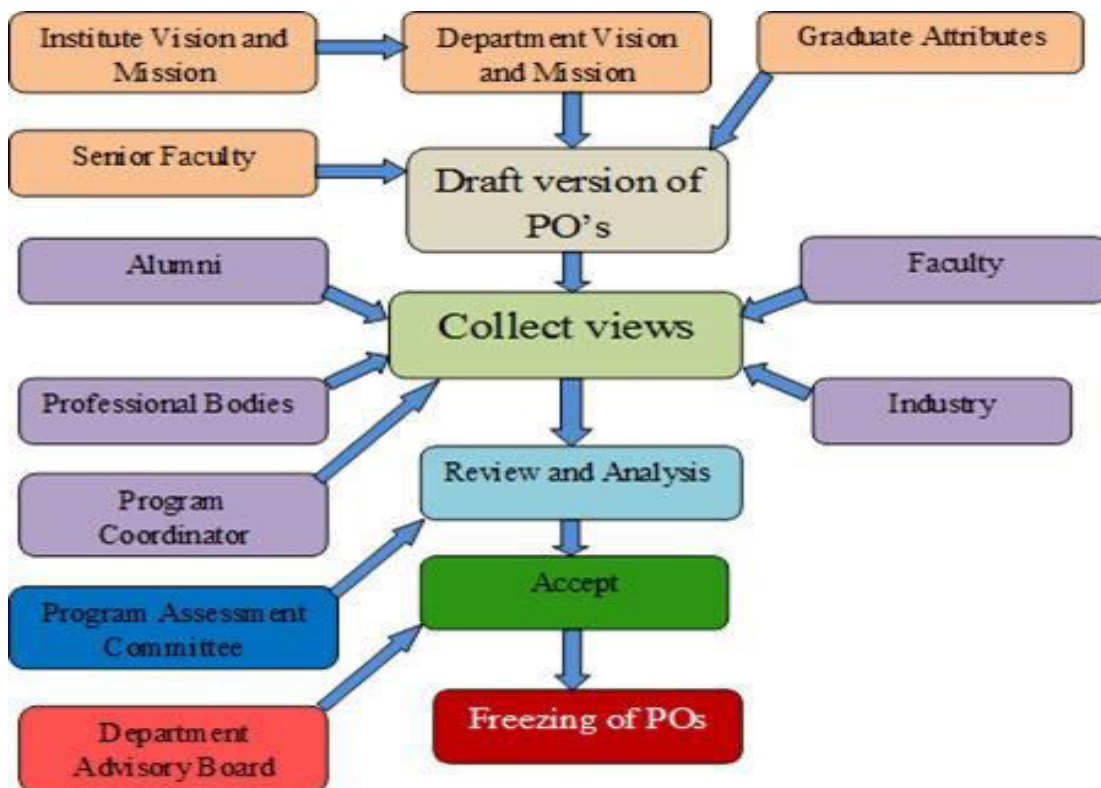


Fig . 3.2 Process to Define Program Outcomes of the Department

PROGRAM SPECIFIC OUTCOMES

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.

4. 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.

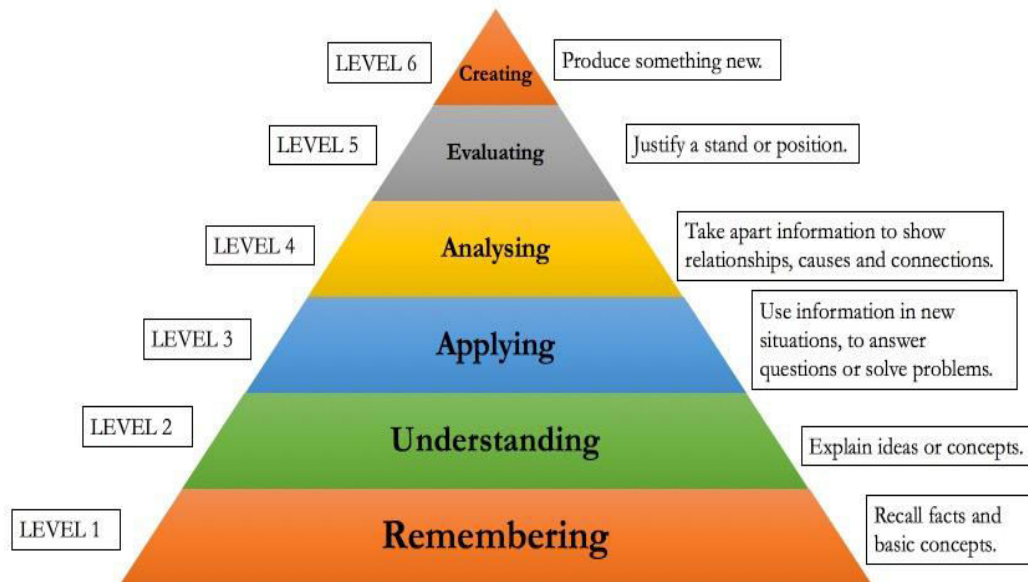


Figure 5.1 Pictorial representation of Blooms Taxonomy

Level 1, Remembering, is the most basic, requiring the least amount of cognitive rigour. This is about students recalling key information, for example, the meaning of a word.

Arrange | Define | Describe | List | Match | Name | Order | Recall | Reproduce

Level 2, Understanding, is to do with students demonstrating an understanding of the facts remembered. At this level, the student who recalls the definition of a word, for example, would also be able to show understanding of the word by using it in the context of different sentences.

Classify | Discuss | Explain | Identify | Report | Summarise

Level 3, Applying, is concerned with how students can take their knowledge and understanding, applying it to different situations. This usually involves students answering questions or solving problems.

Apply | Calculate | Demonstrate | Interpret | Show | Solve | Suggest

Level 4, Analysing, is about students being able to draw connections between ideas, thinking critically, to break down information into the sum of its parts.

Analyse | Appraise | Compare | Contrast | Distinguish | Explore | Infer | Investigate

Level 5, Evaluating, is reached when students can make accurate assessments or judgements about different concepts. Students can make inferences, find effective solutions to problems and justify conclusions, while drawing on their knowledge and understanding.

Argue | Assess | Critique | Defend | Evaluate | Judge | Justify

Level 6, Creating, is the ultimate aim of students' learning journey. At this final level of Bloom's taxonomy, students demonstrate what they have learnt by creating something new, either tangible or conceptual. This might include, for example, writing a report, creating a computer program, or revising a process to improve its results.

Compose | Construct | Create | Devise | Generate | Organise | Plan | Produce

5. 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 5.1: 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

6. 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:

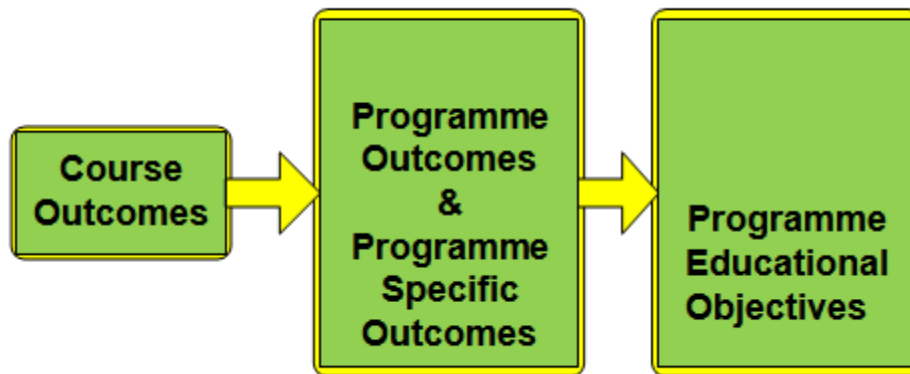
- ✓ **“1” – Slight (Low) Correlation**
- ✓ **“2” – Moderate (Medium) Correlation**
- ✓ **“3” – Substantial (High) Correlation**
- ✓ **“-” indicates there is no correlation.**

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 graduates 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 graduates 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.

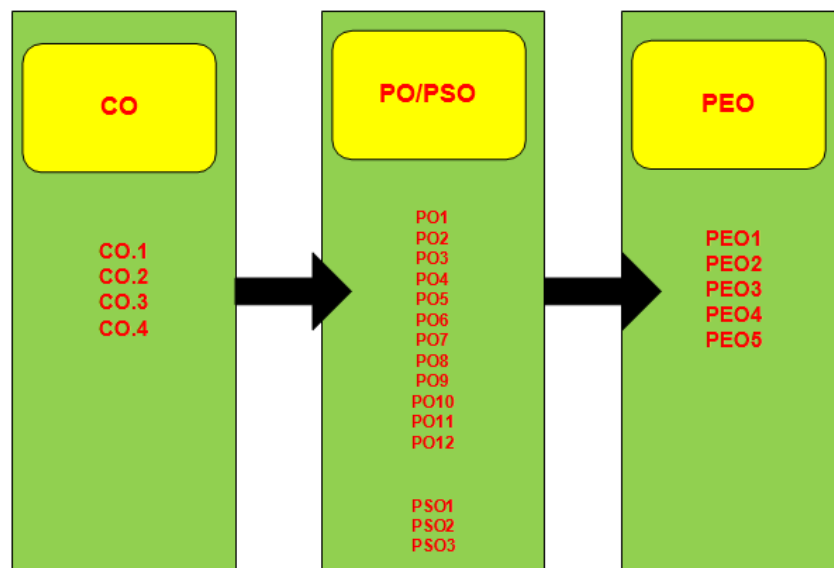


Figure 6.2 : Relationship between CO, PO & PSO and PEO

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.

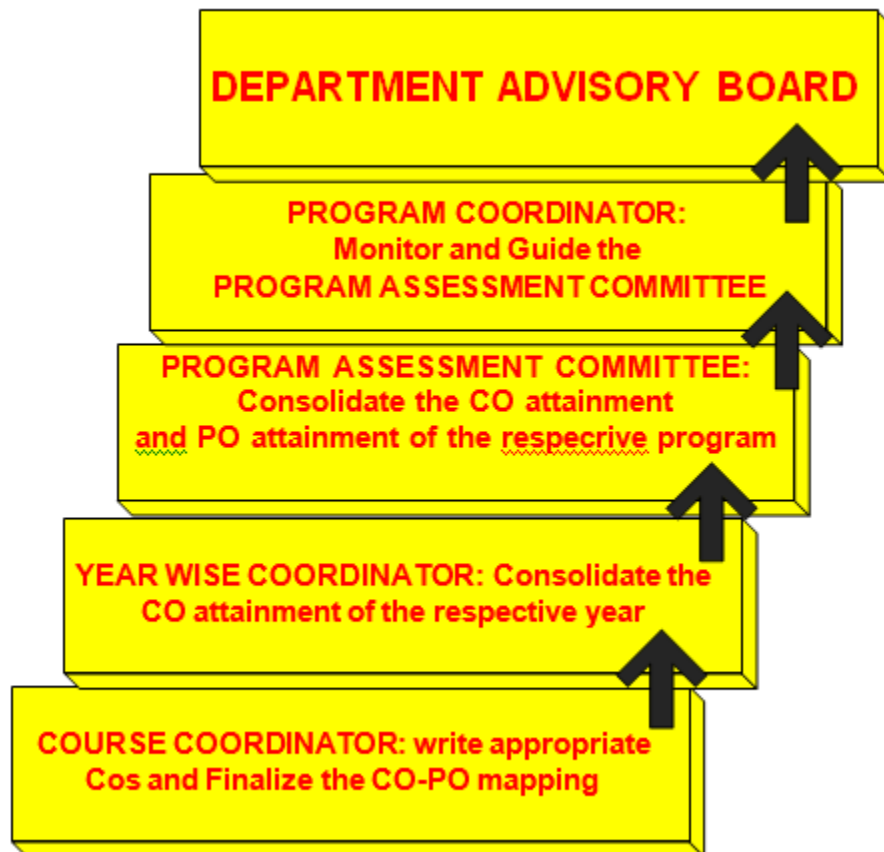


Figure 6.3: Hierarchy of faculty involvement

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 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. 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

Based on CO statements given in table 6.4.

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

Identification of curricular gap

At the time of CO-PO mapping, the course in-charge has to identify the curricular gap in the course, based on the recent technological trends as well as feedback received from the stakeholders. After that, the course in-charge has to discuss with DAB about the steps to be taken to bridge the curricular gap as shown in figure 7.3. Content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, in plant training, online quiz, etc.

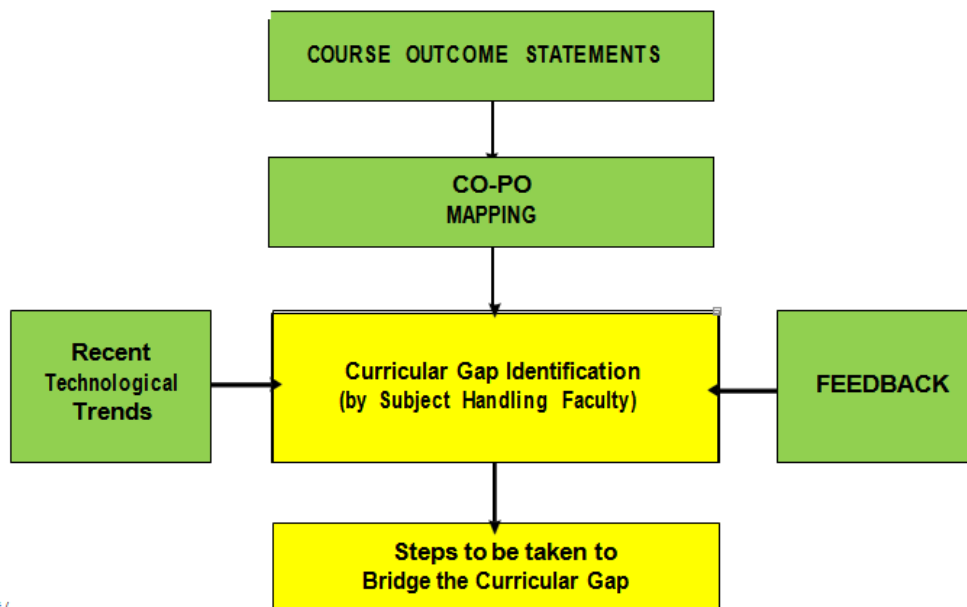


Figure 7.4: Identification of curricular gap

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. Program level CO-PO matrix for all the courses including first year courses will be done by the program coordinator.

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

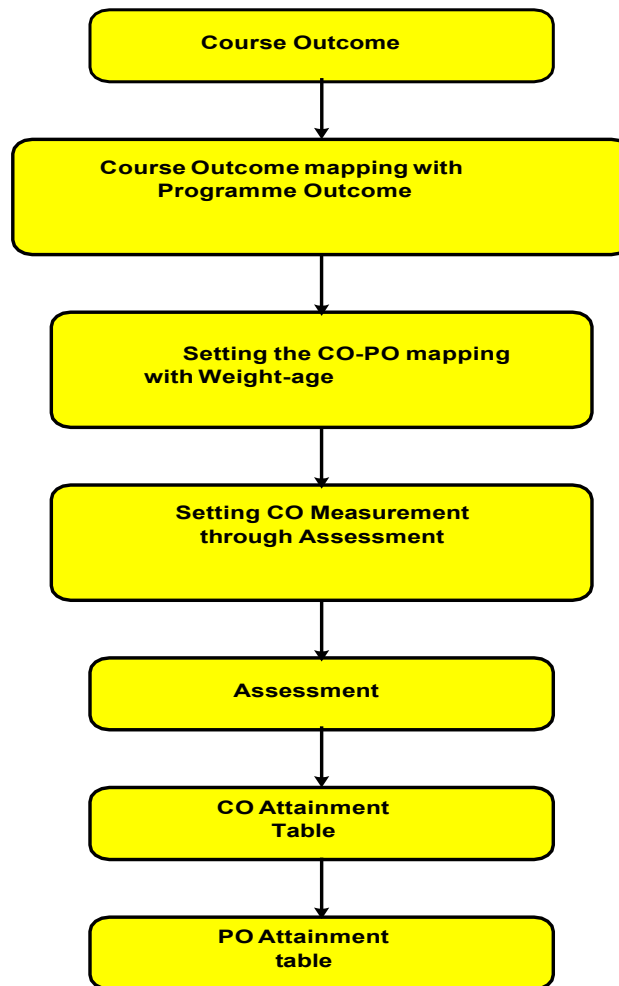
. Validation of CO-PO mapping

Figure. 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.

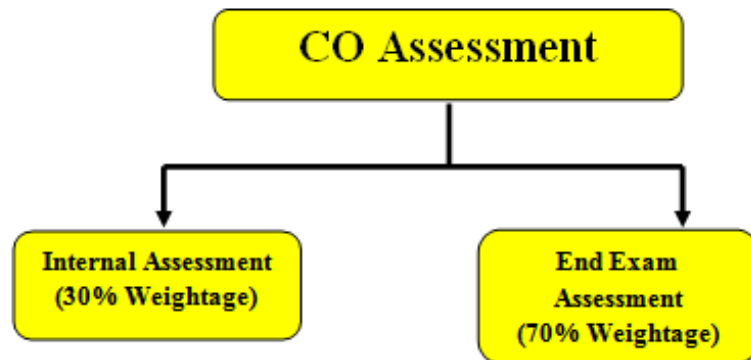
- Step 6 : Obtain PO attainment table through direct and indirect assessment methods.

8. ASSESSMENT PROCESS & TOOLS

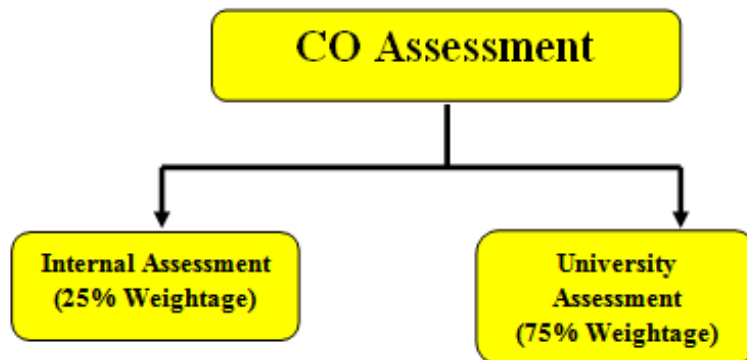
For the evaluation and assessment of CO's and PO's, rubrics are used. The rubrics considered here are given below:

CO Assessment Rubrics:

Autonomous: (R18 & R20)



JNTUH (R16):



Course Outcome is evaluated based on the performance of students in internal assessments and in end exam/university examination of a course.

CO Assessment Tools:

The description of Assessment tools used for the evaluation of program outcomes is given in below Table 3.2.1.1. The various assessment tools used to evaluate COs and the frequency with which the assessment processes are carried out are listed. In each course, the level of attainment of each CO is compared with the predefined targets, if it 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 8.1. Mapping of assessment tools to POs/PSOs with frequency of Assessment

Mode of Assessment	Assessment Tool	Description	Evaluation of course outcomes	Related PO/PSO	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	PO1 to PO12	continuous
Direct	Assignments	Two assignments are for each given course for continuous assessment average marks are considered	internal examinations and assignments are framed in such a way to cover all course outcomes	PO1 to PO12	continuous
Direct	Day to day evaluation in Laboratory	The day to day evaluation is considered	The final attainment for each CO is calculated by taking average of the % attainment from day	PO1 to PO12	continuous
Direct	Internal Practical Examination	Internal examination is conducted	to day evaluation and internal lab examination	PO1 to PO12	One per semester
Direct	End Semester Examination	End Examination is conducted	The questions in the end examinations are mapped against COS of respective course . The questions for end examinations are	PO1 to PO12	One per semester

			framed in such a way to cover all course outcomes		
Direct	Industry oriented mini project/summer internship	To test students concepts in independent analysis. Two project reviews are conducted	Two internal project reviews are conducted and average of these two review assessments are considered	PO1 to PO12	mini Project Review in VII Semester
Direct	Project I & Project II	To test students 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 the validation of the model and documentation. The external examiner assessment is considered as another assessment tool for project work. Final CO attainment calculated from final CO attainment is calculated from	PO1 to PO12	project I -VII semester & Project II- VIII semester
	Technical	To Test the students in	at end of semester a student has to		

Direct	Seminar	knowledge in Recent Technical advancements and their Presentation Skills	Present the seminar and submit the report	PO1 to PO12	VIII Semester
Indirect	Alumini survey	This survey gives the opinion of the student on the attainment of course outcomes	At the end of the programme alumini survey is collected from alumini and considered for the PO attainment under indirect assessment.	PO1 to PO12	At the end of the program
Indirect	Graduate exit survey	This survey gives the opinion of the graduate on the attainment of course outcomes	At the end of the programme exit survey is collected from alumini and considered for the PO attainment under indirect assessment.	PO1 to PO12	At the end of the program

Quality /Relevance of assessment Process

R-18 Regulation (Autonomous)

The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 100 marks for a practical subject. In addition, Technical Seminar, Mini Project and Project stage 1&2 shall be evaluated for 100 marks each.

For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid-term examination consists of one descriptive paper, one objective paper and assignment. The descriptive paper shall be for 20 marks. The descriptive paper shall

contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks. The objective paper shall be for Five (5) marks contain (10) objective questions - each carries half mark and no choice, with a total duration of 2 hours. 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. While the first mid-term examination shall be conducted from 1 to 2 1/2 units of the syllabus, the second mid-term examination shall be conducted from 2 1/2 to 5 units. The total marks secured by the student in each midterm examination are evaluated for 30 marks and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

However, if any student is absent/scoring internal marks less than 40% in any subject of a mid-term examination she will be given a chance to write the internal exam once again after she re-registers for the internal exam in the concerned subject, paying stipulated fees as per the norms.

The end examination will be conducted for 70 marks with 5 questions consisting of two parts each (a) and (b), out of which the student has to answer either (a) or (b), not both and each question carrying 14 marks.

For practical subjects, there shall be a continuous evaluation during a semester for 30 internal marks and 70 end semester examination marks. Out of the 30 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 15 marks conducted by the laboratory teacher concerned. 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 Principal of the College

For the Engineering Drawing subject, the distribution shall be 30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests) and 70 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.

For Mandatory Courses like Environmental Science, Foreign Language- French, Human Values & Professional Ethics, Indian Constitution, Indian Traditional Knowledge, Technical & Soft Skills and Gender Sensitization, a student has to secure 50 marks out of 100 marks.

There shall be an Industrial Oriented Mini Project/Summer Internship, in collaboration with an industry of their specialization. Students will register for this immediately after III year II semester examinations and pursue it during summer vacation. Industrial Oriented Mini Project/Summer Internship shall be submitted in a report form and presented before the committee in IV year I semester. It shall be evaluated for 30 internal marks and 70 external marks. Internal marks shall be evaluated by the departmental committee consisting of Head of the Department, supervisor and a senior faculty member. External marks shall be evaluated by the committee consisting of an external examiner, Head of the Department and supervisor of the Industrial Oriented mini project/Summer Internship.

Assessment Tool		Evaluator
Internal Assessment	Seminar on project	Internal project Review Committee
	Final Report	external
External Assessment	Presentation and Viva – Voce	external

UG project work shall be carried out in two stages: Project Stage – I during IV Year I Semester, Project Stage – II during IV Year II Semester. Each stage will be evaluated for 100 marks. Student has to submit project work report at the end of each semester. First report includes project work carried out in IV Year I semester and second report includes project work carried out in IV Year II Semester. Semester End Examination for both project stages shall be completed before the commencement of Semester End Theory examinations.

For Project Stage – I, the departmental committee consisting of Head of the Department, project supervisor and a senior faculty member shall evaluate the project work for 70 marks and project supervisor shall evaluate for 30 marks. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - I or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) secures less than 40% marks in the sum total of the Continuous Internal Evaluation and Semester End Examination taken together.

A student who has failed may reappear once for the above evaluation, when it is scheduled again; if she fails in such ‘one reappearance’ evaluation also, she has to reappear for the same in the next subsequent semester, as and when it is scheduled.

There shall be a Technical Seminar presentation in IV year II semester. For the seminar, the student shall collect the information on a specialized topic, prepare a technical report, 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 100 internal marks. There shall be no semester end examination for the seminar.

Assessment Tool	
Internal Assessment	Presentation
	Viva-voce
	Report

For Project Stage – II, the external marks evaluation committee constituting of external examiner, Head of the Department and supervisor shall evaluate the project work for 70 marks and the internal marks evaluation committee constituting of Head of the department, senior faculty of the department and project supervisor shall evaluate it for 30 marks. The topics for industrial oriented mini project, seminar and Project Stage – I shall be different from one another. The student is deemed to have failed, if she (i) does not submit a report on Project Stage - II, or does not make a presentation of the same before the external examiner as per schedule, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together.

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

A student who has failed may reappear once for the above evaluation, when it is scheduled again; if student fails in such ‘one reappearance’ evaluation also, she has to reappear for the same in the next subsequent semester, as and when it is scheduled.

R-16 Regulation as per JNTUH:-**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 for 25 marks weightage 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 choices, fill-in 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: The end-semester examinations are of 3-hour duration, 75 marks weightage 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 and Engineering 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 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.

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

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 student's ability to comprehend and write effective reports and design documentation is assessed by evaluating the report.

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 finalize the approach to the problem.
- Prepare a detailed action plan for conducting the investigation, including teamwork.
- 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:

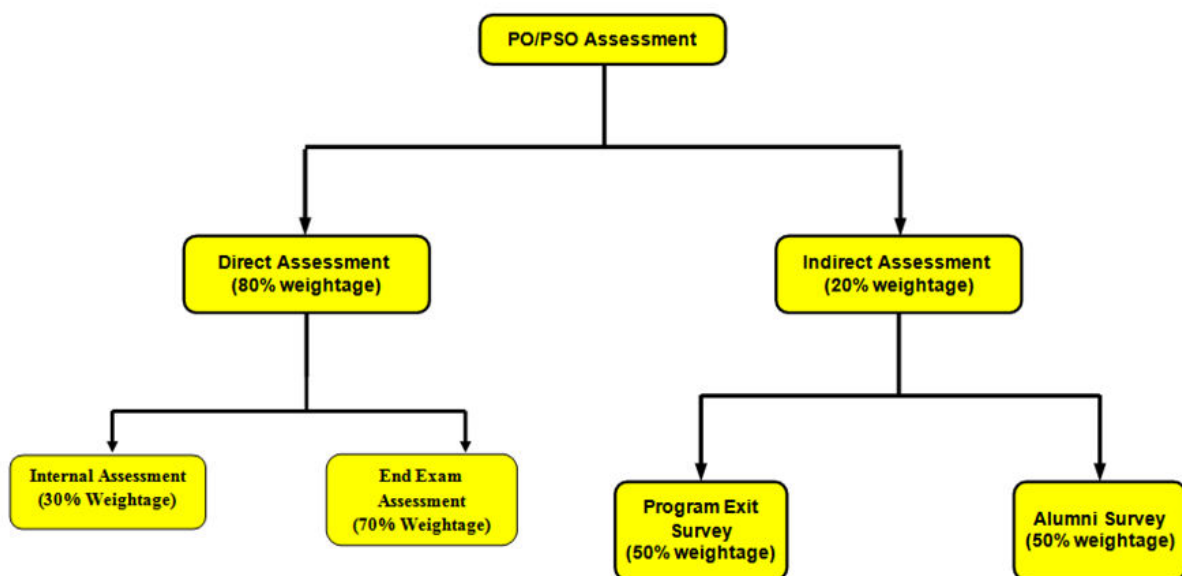
Assessment Tool		Evaluator
Internal Assessment	Seminar on project	Internal project Review Committee
	Final Report	University
External Assessment	Presentation and Viva – Voce	University

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.

9. ASSESSMENT PROCESS FOR OVERALL PO AND PSO ATTAINMENT

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 70% weightage is given to attainment through university exam and 30% 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.

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					
Direct (80% weightage)	CO Assessment	Course Type	Assessment Tools		Minimum Frequency
		Theory	Internal Evaluation	Internal mid Tests	Twice per course
				Assignments	Twice per course
			End 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		
Seminar	Presentation		Once per course		

		Project-I Project-II	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

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.

SAMPLE CALCULATION

**COURSE OUT COME ASSESSEMENT SHEETS FOR TESTS- ALL COURSE
(AT THE END OF SEMESTER)**

Subject: ELECTRONIC DEVICES & CIRCUITS

Mapping of Course outcome with Program Outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	M	M	M							
CO2	H	H	M	M	M							
CO3	H	H	M	M	M							
CO4	H	H	M	M	M							

Mapping of Course outcome with Program Outcomes

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

Internal Assessment - I

		Enter Max. Marks of this course	30	
Internal Assessment-1 (IA-1)				
			MAX. MARKS. : 30	
COs ----->			CO1,CO2	
S.No	HT No.	NAME	MAX.MARKS.: 30	MARKS >=50%
1	18RH1A0401	A AKHILA	25	Y
2	18RH1A0402	A DIVYA BHARATHI	28	Y
3	18RH1A0403	ADUNURI ARCHANA	27	Y
4	18RH1A0404	AGARTI HARSHINI SARASWATI	25	Y
5	18RH1A0405	AKEPATI TRIVENI	25	Y
6	18RH1A0406	AKSHANTHALA NAVYA SRI	29	Y
248	19RH5A0413	KUCHANPALLY NIKHITHA	25	Y
249	19RH5A0414	KUNDE UMASRI	27	Y
250	19RH5A0415	KUNTA ANUSHA	28	Y
251	19RH5A0416	MATHANGI VAGDEVI	26	Y
252	19RH5A0417	SAI KRUPANI G S	26	Y
253	19RH5A0418	KATURU VENKATA NAGA DEEPTI	28	Y
254	19RH5A0419	SIRIGIRI VANDANA	25	Y
255	19RH5A0420	SOMA SARIKA	28	Y
256	19RH5A0421	THOLPUNURI AMULYA	25	Y
257	19RH5A0422	THOTA GEETHA	28	Y
258	19RH5A0423	VENNU DIVYA	26	Y
259	19RH5A0424	VODDEPALLY ANUPAMA	27	Y
			Y	259
			N	0
			NA	0
			CO-A =Y/(Y+N+NA)	1
		Attainment level		3

Attainment Level = 3 for $\geq 70\%$,
= 2 for $\geq 60\%$,
= 1 for $\geq 50\%$,
= 0 for $< 50\%$

CO Attainment Calculation = *No. of Students Attained / Total No. of Students

*** Students attained = No. of Students got marks $\geq 50\%$**

Internal Assessment - II

		Enter Max. Marks of this course		30
		Internal Assessment-2 (IA-2)		
			MAX. MARKS: 30	
		COs ----->	CO3, CO4	
S.No	HT No.	NAME	MAX.MARKS. 30	MARKS >=50%
1	18RH1A0401	A AKHILA	25	Y
2	18RH1A0402	A DIVYA BHARATHI	28	Y
3	18RH1A0403	ADUNURI ARCHANA	27	Y
4	18RH1A0404	AGARTI HARSHINI SARASWATI	25	Y
5	18RH1A0405	AKEPATI TRIVENI	25	Y
6	18RH1A0406	AKSHANTHALA NAVYA SRI	29	Y
248	19RH5A0413	KUCHANPALLY NIKHITHA	25	Y
249	19RH5A0414	KUNDE UMASRI	27	Y
250	19RH5A0415	KUNTA ANUSHA	28	Y
251	19RH5A0416	MATHANGI VAGDEVI	26	Y
252	19RH5A0417	SAI KRUPANI G S	26	Y
253	19RH5A0418	KATURU VENKATA NAGA DEEPTI	28	Y
254	19RH5A0419	SIRIGIRI VANDANA	25	Y
255	19RH5A0420	SOMA SARIKA	28	Y
256	19RH5A0421	THOLPUNURI AMULYA	25	Y
257	19RH5A0422	THOTA GEETHA	28	Y
258	19RH5A0423	VENNU DIVYA	26	Y
259	19RH5A0424	VODDEPALLY ANUPAMA	27	Y
			Y	259
			N	0
			NA	0
			CO-A =Y/(Y+N+NA)	1
		Attainment level		3

**Attainment Level = 3 for >=70%,
= 2 for >=60%,
=1 for >=50%,
= 0 for <50%**

CO Attainment Calculation = *No. of Students Attained / Total No. of Students

* Students attained = No. of Students got marks $\geq 50\%$

OVERALL INTERNAL ASSESSMENT

Calculation of CO through OVERALL Internal Assessment					
					OVERALL Internal Attainment
				Individual attainment level	
		POs-----→	PO1, PO2, PO3, PO4, PO6, PO7, PO11, PO12		
		COs -----→	CO1, CO2	CO3, CO4	CO1-4
S.No	HT No.	NAME	IA- 1	IA-2	OA= (IA-1 + IA-2)/2
1	18RH1A0401	A AKHILA	3	3	3
2	18RH1A0402	A DIVYA BHARATHI	3	3	3
3	18RH1A0403	ADUNURI ARCHANA	3	3	3
4	18RH1A0404	AGARTI HARSHINI SARASWATI	3	3	3
5	18RH1A0405	AKEPATI TRIVENI	3	3	3
6	18RH1A0406	AKSHANTHALA NAVYA SRI	3	3	3
248	19RH5A0413	KUCHANPALLY NIKHITHA	3	3	3
249	19RH5A0414	KUNDE UMASRI	3	3	3
250	19RH5A0415	KUNTA ANUSHA	3	3	3
251	19RH5A0416	MATHANGI VAGDEVI	3	3	3
252	19RH5A0417	SAI KRUPANI G S	3	3	3
253	19RH5A0418	KATURU VENKATA NAGA DEEPTI	3	3	3
254	19RH5A0419	SIRIGIRI VANDANA	3	3	3
255	19RH5A0420	SOMA SARIKA	3	3	3
256	19RH5A0421	THOLPUNURI AMULYA	3	3	3
257	19RH5A0422	THOTA GEETHA	3	3	3
258	19RH5A0423	VENNU DIVYA	3	3	3
259	19RH5A0424	VODDEPALLY ANUPAMA	3	3	3

Overall Internal Assessment = Average of (IA-I & IA-II)

CO ATTAINMENT FOR END SEMESTER EXAMINATION:

CO attainment calculation through End Semester examination.					
		MAX. MARKS	70		
			MAX.MARKS. 70		
		POs-----→	PO1, PO2, PO3, PO4, PO6,PO7, PO11, PO12		
		COs -----→	CO1-4		
S.No	HT No.	NAME	MAX. MARKS=70 (OR) CGPA	MARKS ≥50%	EE
1	18RH1A0401	A AKHILA	53	Y	3
2	18RH1A0402	A DIVYA BHARATHI	51	Y	3
3	18RH1A0403	ADUNURI ARCHANA	57	Y	3
4	18RH1A0404	AGARTI HARSHINI SARASWATI	67	Y	3
5	18RH1A0405	AKEPATI TRIVENI	51	Y	3
6	18RH1A0406	AKSHANTHALA NAVYA SRI	56	Y	3
248	19RH5A0413	KUCHANPALLY NIKHITHA	38	Y	1
249	19RH5A0414	KUNDE UMASRI	34	N	0
250	19RH5A0415	KUNTA ANUSHA	49	Y	3
251	19RH5A0416	MATHANGI VAGDEVI	36	Y	1
252	19RH5A0417	SAI KRUPANI G S	46	Y	2
253	19RH5A0418	KATURU VENKATA NAGA DEEPTI	44	Y	2
254	19RH5A0419	SIRIGIRI VANDANA	42	Y	2
255	19RH5A0420	SOMA SARIKA	40	Y	1
256	19RH5A0421	THOLPUNURI AMULYA	45	Y	2
257	19RH5A0422	THOTA GEETHA	51	Y	3
258	19RH5A0423	VENNU DIVYA	36	Y	1
259	19RH5A0424	VODDEPALLY ANUPAMA	64	Y	3
		Y		246	
		N		13	
		NA		0	
		CO-A =Y/(Y+N+NA)		0.95	
		Attainment level		3	

**Attainment Level = 3 for ≥70%,
= 2 for ≥60%,
= 1 for ≥50%,
= 0 for <50%**

End Semester Attainment Calculation = *No. of Students Attained / Total No. of Students

* Students attained = No. of Students got marks $\geq 50\%$

CO ATTAINMENT THROUGH DIRECT ASSESSMENT:

calculation of CO through direct assessment method.							
			OVERALL Internal Attainment	END EXAM (External) Attainment level	70% of UNIVERSITY EXAM (External) Attainment level	20% OF OVERALL Internal Attainment	DIRECT ATTAINME NT LEVEL
	POs---->	PO1, PO2, PO3, PO4, PO6, PO7, PO11, PO12					
	COs---->	CO1-4					
S.No	HT No.	NAME	OA	EE	A=EE * 0.70	B=OIA*0.30	C=A+B
1	18RH1A0401	A AKHILA	3	3	2.1	0.9	3
2	18RH1A0402	A DIVYA BHARATHI	3	3	2.4	0.6	3
3	18RH1A0403	ADUNURI ARCHANA	3	3	2.4	0.6	3
4	18RH1A0404	AGARTI HARSHINI SARASWATI	3	3	2.4	0.6	3
5	18RH1A0405	AKEPATI TRIVENI	3	3	2.4	0.6	3
6	18RH1A0406	AKSHANTHALA NAVYA SRI	3	3	2.4	0.6	3
248	19RH5A0413	KUCHANPALLY NIKHITHA	3	1	0.8	0.6	1.4
249	19RH5A0414	KUNDE UMASRI	3	0	0	0.6	0.6
250	19RH5A0415	KUNTA ANUSHA	3	3	2.4	0.6	3
251	19RH5A0416	MATHANGI VAGDEVI	3	1	0.8	0.6	1.4
252	19RH5A0417	SAI KRUPANI G S	3	2	1.6	0.6	2.2
253	19RH5A0418	KATURU VENKATA NAGA DEEPTI	3	2	1.6	0.6	2.2
254	19RH5A0419	SIRIGIRI VANDANA	3	2	1.6	0.6	2.2
255	19RH5A0420	SOMA SARIKA	3	1	0.8	0.6	1.4
256	19RH5A0421	THOLPUNURI AMULYA	3	2	1.6	0.6	2.2
257	19RH5A0422	THOTA GEETHA	3	3	2.4	0.6	3
258	19RH5A0423	VENNU DIVYA	3	1	0.8	0.6	1.4
259	19RH5A0424	VODDEPALLY ANUPAMA	3	3	2.4	0.6	3

Direct Attainment Level =
70% of End Semester Exam Attainment + 30% of Overall Internal Attainment
CO ATTAINMENT THROUGH INDIRECT ASSESSMENT:

calculation of CO through indirect assessment methods				
			INDIRECT ATTAINMENT- COURSE END SURVERY (IDA)	ATTAINMENT STATUS OF COURSE END
	POs-----→	PO1, PO2, PO3, PO4, PO6,PO7, PO11, PO12		
	COs -----→	CO1-4		
S.No	HT No.	NAME	MAX. POINTS=3	
1	18RH1A0401	A AKHILA	2.7	Y
2	18RH1A0402	A DIVYA BHARATHI	2.9	Y
3	18RH1A0403	ADUNURI ARCHANA	2.8	Y
4	18RH1A0404	AGARTI HARSHINI SARASWATI	2.9	Y
5	18RH1A0405	AKEPATI TRIVENI	2.9	Y
6	18RH1A0406	AKSHANTHALA NAVYA SRI	2.6	Y
248	19RH5A0413	KUCHANPALLY NIKHITHA	2.8	Y
249	19RH5A0414	KUNDE UMASRI	2.9	Y
250	19RH5A0415	KUNTA ANUSHA	2.9	Y
251	19RH5A0416	MATHANGI VAGDEVI	2.6	Y
252	19RH5A0417	SAI KRUPANI G S	2.9	Y
253	19RH5A0418	KATURU VENKATA NAGA DEEPTI	2.8	Y
254	19RH5A0419	SIRIGIRI VANDANA	2.7	Y
255	19RH5A0420	SOMA SARIKA	2.9	Y
256	19RH5A0421	THOLPUNURI AMULYA	2.9	Y
257	19RH5A0422	THOTA GEETHA	2.7	Y
258	19RH5A0423	VENNU DIVYA	2.7	Y
259	19RH5A0424	VODDEPALLY ANUPAMA	2.9	Y
		AVERAGE OF IDA	2.74	

Attainment Status of Course End Survey = Yes for $\geq 50\%$, No for $< 50\%$
Average of Indirect Assessment = Average of all students Attainment status in Course End Survey

CO ATTAINMENT THROUGH INDIVIDUAL DIRECT & INDIRECT ASSESSMENT:

Calculation of CO for individual student through Direct and Indirect assessment methods.								
			DIRECT ATTAINMENT LEVEL (DA)	INDIRECT ATTAINMENT- COURSE END SURVEY (IDA)	OVERALL ATTAINMENT LEVEL	Remarks		
		POs----->	PO1, PO2, PO3, PO4, PO6, PO7, PO11, PO12			OA $\geq 50\%$ THEN Attained else not attained		
		COs ----->	CO1-4					
S.No	HT No.	NAME	(DA)	(IDA)	OA= DA*0.80+IDA* 0.20	OA $\geq 50\%$		
							ATTAINED STUDENTS	246
							NOT ATTAINED STUDENTS	13
1	18RH1A0401	A AKHILA	3	2.7	2.94	ATTAINED		
2	18RH1A0402	A DIVYA BHARATHI	3	2.8	2.96	ATTAINED		
3	18RH1A0403	ADUNURI ARCHANA	3	2.7	2.94	ATTAINED		
4	18RH1A0404	AGARTI HARSHINI SARASWATI	3	2.7	2.94	ATTAINED		
5	18RH1A0405	AKEPATI TRIVENI	3	2.8	2.96	ATTAINED		
6	18RH1A0406	AKSHANTHALA NAVYA SRI	3	2.6	2.92	ATTAINED		
248	19RH5A0413	KUCHANPALLY NIKHITHA	1.4	2.7	1.66	ATTAINED		
249	19RH5A0414	KUNDE UMASRI	0.6	2.8	1.04	NOT ATTAINED		
250	19RH5A0415	KUNTA ANUSHA	3	2.9	2.98	ATTAINED		
251	19RH5A0416	MATHANGI VAGDEVI	1.4	2.8	1.68	ATTAINED		
252	19RH5A0417	SAI KRUPANI G S	2.2	2.6	2.28	ATTAINED		
253	19RH5A0418	KATURU VENKATA NAGA DEEPTI	2.2	2.7	2.3	ATTAINED		
254	19RH5A0419	SIRIGIRI VANDANA	2.2	2.7	2.3	ATTAINED		
255	19RH5A0420	SOMA SARIKA	1.4	2.8	1.68	ATTAINED		
256	19RH5A0421	THOLPUNURI AMULYA	2.2	2.9	2.34	ATTAINED		
257	19RH5A0422	THOTA GEETHA	3	2.7	2.94	ATTAINED		
258	19RH5A0423	VENNU DIVYA	1.4	2.6	1.64	ATTAINED		
259	19RH5A0424	VODDEPALLY ANUPAMA	3	2.9	2.98	ATTAINED		

Individual Overall Attainment Status of the Course = Attained for $\geq 50\%$, Not Attained for $< 50\%$

Overall Attainment = 80% of Direct Attainment + 20% of Indirect Attainment

CO ATTAINMENT			
CO	IA-1 (in percentage)	IA-2 (In Percentage)	AVERAGE OF CORRESPONDIN
CO-1	100		100
CO-2	100		100
CO-3		100	100
CO-4		100	100
		AVERAGE ATTAINMENT PERCENTAGE	100
		INTERNAL ATTAINMENT VALUE	3
		EXTERNAL ATTAINMENT VALUE	3
		OVERALL DIRECT CO ATTAINMENT	3
		INDIRECT CO ATTAINMENT	2.74
		OVERALL CO ATTAINMENT	2.948

Overall Direct CO Attainment = 70% of External Attainment(Avg.) + 30% of Internal Attainment(Avg.)

Overall CO Attainment of the Course =

80% of Overall Direct CO Attainment + 20% of Indirect CO Attainment

CO-PO attainment of the course

Course Outcome SUBJECT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2							
CO2	3	3	2	2	2							
CO3	3	3	2	2	2							
CO4	3	3	2	2	2							
Average CO	3	3	2	2	2							

Course Outcome SUBJECT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2.946	2.946	1.964	1.964	1.964							
CO2	2.946	2.946	1.964	1.964	1.964							
CO3	2.946	2.946	1.964	1.964	1.964							
CO4	2.946	2.946	1.964	1.964	1.964							
Average CO	2.95	2.95	1.97	1.97	1.97							

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.

INDIRECT ASSESSMENT TOOLS AND PROCESS

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

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 below sections

Alumni Survey:

Feedback is taken from alumni. Relevant questionnaire in alumni survey form to evaluate attainment of POs and PSOs

Evaluation Process:

The questionnaire consists of 12 questions which is relevant for assessing each PO and 3 questions for assessing each PSO. Each question is having 3 options namely Excellent, Very Good and satisfactory which is given marks 3,2,1 respectively. These survey results are tabulated and the average values corresponding to each PO and PSO are determined

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	I₁	I₂	I₃	I₄	I₅	I₆	I₇	I₈	I₉	I₁₀	I₁₁	I₁₂

Indirect Attainment $I_i = 50\%$ attainment of Graduate Exit survey + 50% attainment of Alumni survey

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

$$\text{Overall Attainment of PO}_i; \quad O_i = 80\% \text{ of } D_i + 20\% \text{ of } I_i$$

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

$$\text{Overall Attainment of PSO}_i; \quad O_i = 80\% \text{ of } D_i + 20\% \text{ of } I_i$$

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

Graduate Exit Survey – Questionnaires

S.No	Program Outcomes(POs)	POs	Excellent(3)	Very Good(2)	Satisfactory(1)
1.	I have gained knowledge of mathematics, science, and engineering for solving Engineering problems and modeling	PO1			
2.	I have an ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components	PO2			
3.	I am able to apply engineering knowledge to design a complex electronic system or process to meet desired specifications and needs	PO3			
4.	I am able to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.	PO4			
5.	I have the opportunity to use the techniques, skills and modern engineering tools necessary for engineering practice	PO5			
6.	Able to show the understanding of professional, health, safety, legal, cultural and social responsibilities	PO6			
7.	I am able to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development	PO7			
8.	I am able to apply ethical principles, responsibility and norms of the engineering practice	PO8			
9.	I can able to function on multi-disciplinary teams.	PO9			
10.	I can able to communicate and present effectively	PO10			
11.	I am able 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	PO11			
12.	I have an ability to engage in, to resolve contemporary issues and lifelong learning	PO12			

S.No	Program Specific Outcomes(POs)	POs	Excellent(3)	Very Good(2)	Satisfactory(1)
1.	I am able 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.	PSO1			
2.	I am able 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	PSO2			
3.	I am able to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities	PSO3			

Alumni Feedback Survey– Questionnaires

S.No	Program Outcomes(POs)	POs	Excellent(3)	Very Good(2)	Satisfactory(1)
1.	How do you rate the engineering knowledge obtained during course period?	PO1			
2.	How do you find the programme related to problem analysis?	PO2			
3.	Were able to design solutions for complex engineering problems?	PO3			
4.	Did you use research based knowledge for interpreting your data during project work?	PO4			
5.	How this programme helped in applying modern tool usage for your problems?	PO5			
6.	How do you rate your understanding of impact of engineering solutions in a global on the society, economic, environmental aspects?	PO6			
7.	Did you understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7			
8.	Were you able to apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice?	PO8			
9.	Did you have opportunity to function as an individual or in a team?	PO9			
10.	How do you rate your skill of communicating effectively in speech and in writing, including documentation of hardware and software systems?	PO10			
11.	Were you able to manage project and finance aspects effectively in your work environment?	PO11			
12.	How far this programme helped you to acquire new knowledge in the engineering discipline and to engage in life- long learning?	PO12			

S.No	Program Specific Outcomes(POs)	POs	Excellent(3)	Very Good(2)	Satisfactory(1)
1.	Are our graduates are able 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?	PSO1			
2.	Are our graduates are able 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?	PSO2			
3.	Are our graduates are able to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities?	PSO3			

10. ASSESSMENT PROCESS OF THE ATTAINMENT OF PROGRAMME EDUCATIONAL OBJECTIVES

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. S. Sathish Dr. N. Jagadeesan	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 .S.Sathish Dr. TS Ghouse Basha	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.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	Dr. K. Sudhakar Dr. TS Ghouse Basha	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. N. Jagadeesan Mr. G. Harish Kumar	To train and prepare the students for placement	PEO-1 PEO-2 PEO-4 PEO-5
6	Student Mentoring Committee	Dr.N.Sreekanth Dr.L.Malliga Mrs. CP Bhargavi	To solve problems faced by the students	PEO-1 PEO-2 PEO-3 PEO-4
7	Consultancy and R&D Advisory Committee	Dr.N.Sreekanth Dr .S.Sathish Dr. SMP Samy Dr. TS Ghouse Basha	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	Prof. S. Babu Rao Mrs. Sushma	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 Kumar 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	Mr. G Harish Kumar Mr. B. Adithya	To contact and oversee the Alumni affairs like conducting special lectures by Alumni recruited in Industry	PEO-1 PEO-2 PEO-4

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 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.
- 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. 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

The attainment of the PEOs**The Expected Level of Attainment for each of the Program Educational Objectives**

Table. Levels of Attainment for each PEO

PEO	Level of Attainment
Value $\geq 70\%$	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. PEO Evaluation Criteria

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

ECE: 2018-22 BATCH

2018 BATCH SUBJECTS LIST:

		SUBJECTS
I YEAR I SEMESTER	1800BS01	Mathematics – I
	1800BS05	Applied Physics
	1805ES01	Programming for Problem Solving
	1803ES01	Engineering Graphics
	1800BS06	Applied Physics Lab
	1805ES61	Programming for Problem Solving Lab
	1800MC01	Environmental science
I YEAR II SEMESTER	1800HS01	English
	1800BS02	Mathematics – II
	1800BS07	Engineering Chemistry
	1802ES01	Basic Electrical Engineering
	1803ES02	Engineering Workshop
	1800HS02	English Language and Communication Skills Lab
	1800BS08	Engineering Chemistry Lab
	1802ES61	Basic Electrical Engineering Lab
II YEAR I SEMESTER	1800BS03	Mathematics-III
	1805ES02	Computer Organization & Operating Systems
	1804PC01	Electronic Devices & Circuits
	1804PC02	Signals & Systems
	1804PC03	Network Analysis
	1804PC61	Electronic Devices & Circuits Lab
	1804PC62	Basic Simulation Lab
	1800MC03	Foreign Language: French
II YEAR II SEMESTER	1805ES03	Basics of Data Structures
	1804PC04	Analog Circuits
	1802PC05	Analog and Digital Communications
	1804PC06	Control Systems
	1804PC07	Probability Theory & Stochastic Process
	1804PC63	Analog Circuits Lab
	1804PC64	Analog & Digital Communication Lab
	1800MC02	Human Values and Professional Ethics
III YEAR I SEMESTER	1800HS04	Managerial Economics & Financial Analysis
	1800HS06	Professional English
	1804PC08	Digital System Design
	1805PC09	Linear & Digital IC Applications
	1804PE01	Antennas and Wave Propagation
	1812OE01	Python Programming
	1804PC65	Digital System Design Lab
	1804PC66	Linear & Digital IC Applications Lab
	1800MC04	Indian Constitution
III YEAR II SEMESTER	1800HS05	Management Science
	1804PC10	Digital Signal Processing

	1804PC62	1.75	1.33	1.25	1.25								
	1800MC03									2.00	3.00		
II YEAR II SEMESTER	1805ES03	2.00	1.75	1.50	1.75								
	1804PC04	3.00	3.00	2.00	2.00								
	1802PC05	2.83	2.83	2.17	1.83								
	1804PC06	3.00	2.25	2.33	2.00								
	1804PC07	3.00	3.00	2.00	2.00								
	1804PC63	2.00	2.33	2.00									
	1804PC64	1.75	1.33	1.25	1.25								
	1800MC02						3.00	2.00	3.00				3.00
	1800HS04	2.00	2.50					3.00	2.00	2.00		3.00	2.00
III YEAR I SEMESTER	1800HS06								2.00	3.00	2.00	3.00	
	1804PC08	3.00	3.00	2.00	2.00	3.00							
	1805PC09	3.00	3.00	2.00	2.00	1.00							
	1804PE01	3.00	3.00	2.00	2.00								
	1812OE01	3.00	3.00	3.00	2.80	1.80							
	1804PC65	1.00	2.00	2.67	2.33								
	1804PC66	3.00	2.00	1.00	2.00	1.00							
	1800MC04	C								2.00	3.00	2.00	
	1800HS05						2.00	2.00		2.00		3.00	2.00
III YEAR II SEMESTER	1804PC10	3.00	2.33	2.33	2.00	2.00							
	1804PC11	3.00	3.00	3.00	2.50								
	1804PE04	3.00	2.00	2.00	2.00	3.00							
	1805OE03	2.00	3.00	3.00	2.50	3.00							
	1804PE08	3.00	2.00		2.00	2.00							
	1804PC67	3.00	2.60	2.60	1.80	3.00							
	1804PC68	2.75	2.50	2.50	2.00	2.00	2.00						
	1804MC05						2.00			3.00	3.00	3.00	3.00
	IV YEAR I SEMESTER	1804PC12	3.00	2.00	2.00								
1804PC13		3.00	3.00	3.00	3.00	3.00							
1804PE10		2.40	2.20	2.80	3.00								
1805OE05		2.67	2.33	3.00	3.00								
1804PC69		2.00	2.00	3.00	2.00	3.00							
1804PC70		2.00	3.00	3.00	3.00	3.00							
1804PR01		3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00		3.00	
1804PR02		3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00		3.00	
1800MC06							3.00		2.00	2.00			3.00
IV Yr II SEM	1804PE15	3.00	3.00	2.80	2.00	3.00							
	1804PE16	3.00	2.00	2.00	2.00								
	1805OE08	2.50	2.00	1.00									
	1804PR03	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	3.00		3.00	
	1804PR04	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00		3.00	
		2.66	2.48	2.31	2.23	2.45	2.65	2.27	2.57	2.48	3.00	2.78	2.75

CO-PO ATTAINMENT MATRIX:

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I YEAR I SEMESTER	1800BS01	2.96											
	1800BS05	1.97						2.47					
	1805ES01	2.96	2.96	2.96		2.47							
	1803ES01	2.39	1.59		1.59	1.59							
	1800BS06	1.97						2.46					
	1805ES61	1.23	1.97	2.63		2.56							
	1800MC01							2.95					
I YEAR II SEMESTER	1800HS01									2.22	2.95		2.95
	1800BS02	2.96											
	1800BS07	2.63	2.22				2.47						
	1802ES01	1.84	1.84	1.23	1.84								
	1803ES02	2.96	2.96	1.97	1.97			1.97					
	1800HS02									2.95	2.95		2.95
	1800BS08	2.63	2.22		2.96								
	1802ES61	1.97	1.64	1.64	1.97								
II YEAR I SEMESTER	1800BS03	2.95											
	1805ES02	2.96	2.30	2.14	1.97								
	1804PC01	2.95	2.95	1.97	1.97	1.97							
	1804PC02	2.94	2.94	1.96	1.96	1.96							
	1804PC03	2.96	2.96	1.97	1.97	1.97							
	1804PC61	2.46	1.23	2.70	1.23								
	1804PC62	1.72	1.31	1.23	1.23								
	1800MC03									1.97	2.95		
II YEAR II SEMESTER	1805ES03	1.96	1.71	1.47	1.71								
	1804PC04	2.39	2.39	1.59	1.59								
	1802PC05	2.26	2.26	1.73	1.46								
	1804PC06	2.94	2.21	2.29	1.96								
	1804PC07	2.95	2.95	1.97	1.97								
	1804PC63	1.97	2.29	1.97									
	1804PC64	1.72	1.31	1.23	1.23								
	1800MC02						2.95	1.97	2.95				2.95
III YEAR I SEMESTER	1800HS04	1.97	2.46					2.95	1.97	1.97		2.95	1.97
	1800HS06									1.97	2.96	1.97	2.96
	1804PC08	2.95	2.95	1.97	1.97	2.95							
	1805PC09	2.96	2.96	1.97	1.97	0.99							
	1804PE01	2.97	2.97	1.98	1.98								
	1812OE01	2.95	2.95	2.95	2.75	1.77							
	1804PC65	0.99	1.97	2.63	2.30								
	1804PC66	2.95	1.97	0.98	1.97	0.98							
	1800MC04									1.97	2.96	1.97	
III YEAR II SEMESTER	1800HS05						1.97	1.97		1.97		2.96	1.97
	1804PC10	2.40	1.87	1.87	1.60	1.60							
	1804PC11	1.84	1.84	1.84	1.54								
	1804PE04	2.97	1.98	1.98	1.98	2.97							

	1805OE03	1.97	2.96	2.96	2.47	2.96							
	1804PE08	2.97	1.98		1.98	1.98							
	1804PC67	2.95	2.56	2.56	1.77	2.95							
	1804PC68	2.72	2.48	2.48	1.98	1.98	1.98						
	1804MC05						1.98			2.97	2.97	2.97	2.97
IV YEAR I SEMESTER	1804PC12	2.95	1.97	1.97									
	1804PC13	2.94	2.94	2.94	2.94	2.94							
	1804PE10	2.35	2.16	2.74	2.94								
	1805OE05	2.61	2.29	2.94	2.94								
	1804PC69	1.97	1.97	2.96	1.97	2.96							
	1804PC70	1.97	2.95	2.95	2.95	2.95							
	1804PR01	2.97	2.97	2.97	2.97	2.97	2.97	1.98	2.97	2.97		2.97	
	1804PR02	2.96	2.96	2.96	2.96	2.96	2.96	1.97	2.97	2.96		2.96	
	1800MC06						2.95		1.97	1.97			2.95
IV Yr II SEM	1804PE15	2.95	2.95	2.75	1.96	2.95							
	1804PE16	2.95	1.97	1.97	1.97								
	1805OE08	2.45	1.96	0.98									
	1804PR03	2.97	2.97	2.97	2.97	2.97	2.97	1.98	1.98	2.97		2.97	
	1804PR04	2.97	2.97	2.97	2.97	2.97	2.97	1.98	2.97	2.97		2.97	
		2.53	2.36	2.21	2.11	2.39	2.62	2.24	2.54	2.45	2.96	2.74	2.71

CO-PSO MAPPING & ATTAINMENT:

		MAPPING			ATTAINMENT		
		PSO 1	PSO2	PSO3	PSO1	PSO2	PSO3
I YEAR I SEMESTER	1800BS01	3			2.96		
	1800BS05	2			1.97		
	1805ES01	2	2		1.97	1.97	
	1803ES01	3	2		2.39	1.59	
	1800BS06	2			1.97		
	1805ES61	2	2		1.97	1.97	
	1800MC01		2	3		1.97	2.96
I YEAR II SEMESTER	1800HS01			3			2.95
	1800BS02	3			2.96		
	1800BS07	2	1		1.97	0.99	
	1802ES01	3	3		1.84	1.84	
	1803ES02	3	2		2.96	1.97	
	1800HS02			3			2.96
	1800BS08	2	1		1.97	0.98	
	1802ES61	3			2.95		
II YEAR I SEMESTER	1800BS03	3			2.95		
	1805ES02	2	2		1.97	1.97	
	1804PC01	3			2.95		
	1804PC02	3			2.94		
	1804PC03	3			2.96		
	1804PC61	3	2		2.95	1.97	
	1804PC62	3	3		2.95	2.95	
	1800MC03			3			2.95

II YEAR II SEMESTER	1805ES03	2	2		1.96	1.96	
	1804PC04	3			2.39		
	1802PC05	3			2.39		
	1804PC06	3			2.94		
	1804PC07	3			2.95		
	1804PC63	3	3		2.95	2.95	
	1804PC64	3	2		2.95	1.97	
	1800MC02		3	3		2.95	2.95
III YEAR I SEMESTER	1800HS04		2	3		1.97	2.95
	1800HS06			3			2.96
	1804PC08	3			2.95		
	1805PC09	3			2.96		
	1804PE01	3			2.97		
	1812OE01	2	3		1.97	2.95	
	1804PC65	3			2.96		
	1804PC66	3	3		2.95	2.95	
	1800MC04		3	3		2.96	2.96
III YEAR II SEMESTER	1800HS05		2	3		1.97	2.96
	1804PC10	3			2.40		
	1804PC11	3			1.84		
	1804PE04	3			2.97		
	1805OE03	2	2		1.97	1.97	
	1804PE08	3			2.97		
	1804PC67	3	2		2.95	1.97	
	1804PC68	3			2.97		
	1804MC05			3			2.97
IV YEAR I SEMESTER	1804PC12	2			1.97		
	1804PC13	3			2.94		
	1804PE10	3			2.94		
	1805OE05	2	2		1.96	1.96	
	1804PC69	2	2		1.97	1.97	
	1804PC70	3	3		2.95	2.95	
	1804PR01	3	3	3	2.97	2.97	2.97
	1804PR02	3	3	3	2.96	2.96	2.96
	1800MC06			3			2.95
IV Yr II SEM	1804PE15	3			2.95		
	1804PE16	3			2.95		
	1805OE08	1			0.98		
	1804PR03	3	3	3	2.90	2.90	2.90
	1804PR04	3	3	3	2.97	2.97	2.97
		2.71	2.34	3.00	2.58	2.26	2.95

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
MAPPING	2.66	2.48	2.31	2.23	2.45	2.65	2.27	2.57	2.48	3.00	2.78	2.75
ATTAINMENT	2.53	2.36	2.21	2.11	2.39	2.62	2.24	2.54	2.45	2.96	2.74	2.71
%	95.33	95.02	95.40	94.66	97.32	98.75	98.63	98.74	98.69	98.59	98.79	98.53

PO-PEO ATTAINMENT:

PO\PEO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	95.33				
PO2			95.02		
PO3		95.40			
PO4		94.66			
PO5		97.32			
PO6	98.75				
PO7	98.63				
PO8	98.74			98.74	
PO9			98.69	98.69	
PO10				98.59	
PO11		98.79	98.79	98.79	98.79
PO12					98.53
AVG	97.86	96.54	97.50	98.70	98.66

AVG	97.16	96.06	97.35	98.38	98.34
60%	58.29	57.64	58.41	59.03	59.01
PLAC HIGHER STUDIES (20%)	17	17	17	17	17
GRADUATE EXIT SURVEY (10%)	9.8	9.8	9.8	9.8	9.8
ALUMNI SURVEY (10%)	9.4	9.4	9.4	9.4	9.4
TOTAL	94.49	93.84	94.61	95.23	95.21

Assessment of Indirect attainment of PO and PSO

PO & PSO Attainment for Year 2018-22															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Direct Attainment	2.53	2.36	2.21	2.11	2.39	2.62	2.24	2.54	2.45	2.96	2.74	2.71	2.58	2.26	2.95
Program Exit Survey	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.7	2.8	2.8
Alumni Survey	2.9	2.9	2.9	2.8	2.9	2.8	2.7	2.7	2.6	2.7	2.6	2.6	2.7	2.7	2.7
Indirect Attainment	2.9	2.9	2.9	2.85	2.9	2.85	2.8	2.8	2.75	2.8	2.75	2.75	2.7	2.75	2.75
Direct Attainment (80%)	2.024	1.888	1.768	1.688	1.912	2.096	1.792	2.032	1.96	2.368	2.192	2.168	2.064	1.808	2.36
Indirect Attainment (20%)	0.58	0.58	0.58	0.57	0.58	0.57	0.56	0.56	0.55	0.56	0.55	0.55	0.54	0.55	0.55
Overall PO Attainment	2.604	2.468	2.348	2.258	2.492	2.666	2.352	2.592	2.51	2.928	2.742	2.718	2.604	2.358	2.91

PO & PSO Attainment for Year 2017-21															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Direct Attainment	2.49	2.31	2.14	2.10	2.18	2.35	2.22	2.49	2.30	2.95	2.56	2.71	2.34	2.11	2.90
Program Exit Survey	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Alumni Survey	2.9	2.9	2.9	2.7	2.9	2.7	2.7	2.7	2.5	2.7	2.5	2.5	2.7	2.7	2.7
Indirect Attainment	2.90	2.90	2.9	2.80	2.90	2.80	2.80	2.80	2.70	2.80	2.70	2.70	2.8	2.8	2.8
Direct Attainment (80%)	1.99	1.848	1.712	1.68	1.744	1.88	1.776	1.99	1.84	2.36	2.048	2.168	1.872	1.688	2.32
Indirect Attainment (20%)	0.58	0.58	0.58	0.56	0.58	0.56	0.56	0.56	0.54	0.56	0.54	0.54	0.56	0.56	0.56
Overall PO Attainment	2.57	2.4	2.29	2.2	2.3	2.44	2.3	2.6	2.4	2.93	2.59	2.71	2.43	2.25	2.88

PO & PSO Attainment for Year 2016-20															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Direct Attainment	1.98	1.74	1.69	1.65	1.8	2.08	2.22	2.36	2.04	2.95	1.95	2.55	1.86	1.63	2.54
Program Exit Survey	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.8	2.8	2.8
Alumni Survey	2.8	2.8	2.8	2.7	2.7	2.8	2.8	2.8	2.5	2.7	2.6	2.6	2.7	2.6	2.6
Indirect Attainment	2.85	2.85	2.85	2.8	2.8	2.85	2.85	2.85	2.7	2.8	2.75	2.75	2.75	2.7	2.7
Direct Attainment (80%)	1.584	1.392	1.352	1.32	1.44	1.664	1.776	1.888	1.632	2.36	1.56	2.04	1.488	1.304	2.032
Indirect Attainment (20%)	0.57	0.57	0.57	0.56	0.56	0.57	0.57	0.57	0.54	0.56	0.55	0.55	0.55	0.54	0.54
Overall PO Attainment	2.154	1.962	1.922	1.88	2	2.234	2.346	2.456	2.172	2.92	2.11	2.59	2.038	1.844	2.572

Assessment of Indirect attainment of PEOs and POs

Direct Evaluation of Program Outcomes (POs) of the concerned PEO A.Y. 2018-22

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct Attainment	2.53	2.36	2.21	2.11	2.39	2.62	2.24	2.54	2.45	2.96	2.74	2.71
(%) Direct Attainment	95.33	95.02	95.40	94.66	97.32	98.75	98.63	98.74	98.69	98.59	98.79	98.53

PO\PEO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	95.33				
PO2			95.02		
PO3		95.40			
PO4		94.66			
PO5		97.32			
PO6	98.75				
PO7	98.63				
PO8	98.74			98.74	
PO9			98.69	98.69	
PO10				98.59	
PO11		98.79	98.79	98.79	98.79
PO12					98.53
AVG	97.86	96.54	97.50	98.70	98.66

% Average Achievement of PEOs = 97.852%

	Name of the Evaluation Criterion	Weightages in %
Direct Assessment (80%)		
1.	Direct Evaluation of Program Outcomes (POs) of the concerned PEO	60
2.	Placements/ Higher Studies	20
Indirect Assessment (20%)		
3.	Graduate Exit Survey	10
4.	Alumni Survey	10
	Total	100

AVG	97.16	96.06	97.35	98.38	98.34
60%	58.29	57.64	58.41	59.03	59.01
PLAC HIGHER STU(20%)	18	18	18	18	18
GRA EXIT SUR(10%)	9.9	9.9	9.9	9.9	9.9
ALUMNI SUR(10%)	9.4	9.4	9.4	9.4	9.4
TOTAL	95.59	94.94	95.71	96.33	96.31

Graduation Batch	PEO-I	PEO-II	PEO-III	PEO-IV	PEO-V	Whether Expected level of PEO is achieved?
2018-2022	95.59	94.94	95.71	96.33	96.31	YES

Direct Evaluation of Program Outcomes (POs) of the concerned PEO A.Y. 2017-21

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct Attainment	2.49	2.31	2.14	2.10	2.18	2.35	2.22	2.49	2.30	2.95	2.56	2.71
(%) Direct Attainment	92.73	95.36	95.55	94.03	96.36	99.02	98.52	98.37	98.39	98.47	98.31	98.38

PEO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	92.73				
PO2			95.36		
PO3		95.55			
PO4		94.03			
PO5		96.36			
PO6	99.02				
PO7	98.52				
PO8	98.37			98.37	

PO9			98.39	98.39	
PO10				98.47	
PO11		98.31	98.31	98.31	98.31
PO12					98.38
AVG	97.16	96.06	97.35	98.38	98.34
AVG(PEOs) (%)	97.46				

% Average Achievement of PEOs = 97.46%

Graduation Batch	PEO-I	PEO-II	PEO-III	PEO-IV	PEO-V	Whether Expected level of PEO is achieved?
2017-2021	95.19	94.54	95.31	95.93	95.91	YES

Direct Evaluation of Program Outcomes (POs) of the concerned PEO A.Y. 2016-20

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct Attainment	1.98	1.74	1.69	1.65	1.80	2.08	2.22	2.36	2.04	2.95	1.95	2.55
(%) Direct Attainment	72.78	71.95	74.99	75.01	79.59	87.67	98.44	93.05	87.63	98.18	74.97	92.77

PEO \ PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	72.78				
PO2			71.95		
PO3		74.99			
PO4		75.01			
PO5		79.59			
PO6	87.67				
PO7	98.44				

PO8	93.05			93.05	
PO9			87.63	87.63	
PO10				98.18	
PO11		74.97	74.97	74.97	74.97
PO12					92.77
AVG	87.98	76.14	78.19	88.46	83.87
AVG(PEOs) (%)	82.93				

% Average Achievement of PEOs = 82.93%

AVG	87.98	76.14	78.19	88.46	83.87
60%	52.79	45.68	46.91	53.08	50.32
PLAC HIGHER STU(20%)	17	17	17	17	17
GRA EXIT SUR(10%)	9.6	9.6	9.6	9.6	9.6
ALUMNI SUR(10%)	9.3	9.3	9.3	9.3	9.3
TOTAL	88.69	81.58	82.81	88.98	86.22

Graduation Batch	PEO-I	PEO-II	PEO-III	PEO-IV	PEO-V	Whether Expected level of PEO is achieved?
2016-2020	88.96	81.58	82.81	88.98	86.22	YES

Direct Evaluation of Program Outcomes (POs) of the concerned PEO A.Y. 2015-19

Average of direct attainments of PO_i obtained for all Courses (2015-2019):

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Direct Attainment	1.48	1.43	1.44	1.29	1.22	1.10	0.97	1.88	1.18	1.32	0.94	1.22
(%) Direct Attainment	55.64	57.55	60.93	54.05	59.11	55.21	52.41	78.08	53.65	52.69	43.83	56.81

PEO \ PO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	55.644				
PO2		57.55443	57.554		
PO3			60.934		
PO4		54.04779	54.048		
PO5		59.11031	59.11		
PO6				55.214	55.214
PO7				52.41	
PO8				78.076	78.076
PO9				53.65	
PO10				52.686	
PO11		43.82861		43.829	43.829
PO12				56.814	56.814
AVG	55.64	53.64	57.91	56.10	58.48
AVG(PEOs) (%)	56.35				

% Average Achievement of PEOs = 56.35%

	Name of the Evaluation Criterion	Weightages in %
Direct Assessment (80%)		
1.	Direct Evaluation of Program Outcomes (POs) of the concerned PEO	60
2.	Placements/ Higher Studies	20
Indirect Assessment (20%)		
3.	Graduate Exit Survey	10
4.	Alumni Survey	10
	Total	100

Graduation Batch	PEO-I	PEO-II	PEO-III	PEO-IV	PEO-V	Whether Expected level of PEO is achieved?
2015-2019	70.99	69.78	72.35	71.26	72.69	YES