

## **Department essential Processes for NBA Accreditation.**

### **1. Vision , Mission and Program Educational Objectives (PEOs)**

The Vision, Mission and PEOs of the department are reviewed and finalized by the advisory board which comprises of the internal and external stakeholders as members. The department advisory board is composed of the head of the department, senior faculties, management representative, alumni, industrial representative, parents and students. The department advisory board reviews the Vision, Mission and PEOs after a careful consideration of feedbacks (suggestions) received from the internal and external stakeholders. Subsequently the members discussed and verified the consistency of the framed Vision, Mission and PEOs with the institutional Vision and Mission. The approved version of Vision, Mission and PEOs will be published through all modes of dissemination. The Pictorial representation of the Process for defining the Vision and Mission is shown in figure 1.1.

**In establishing the vision and mission of the department, the following steps were followed:**

**Step1:** In the initial phase, the Head of the department along with the Department Committee (DC members), conducts brainstorming sessions to define the vision and mission statements which are in alignment with the vision and mission of the institute.

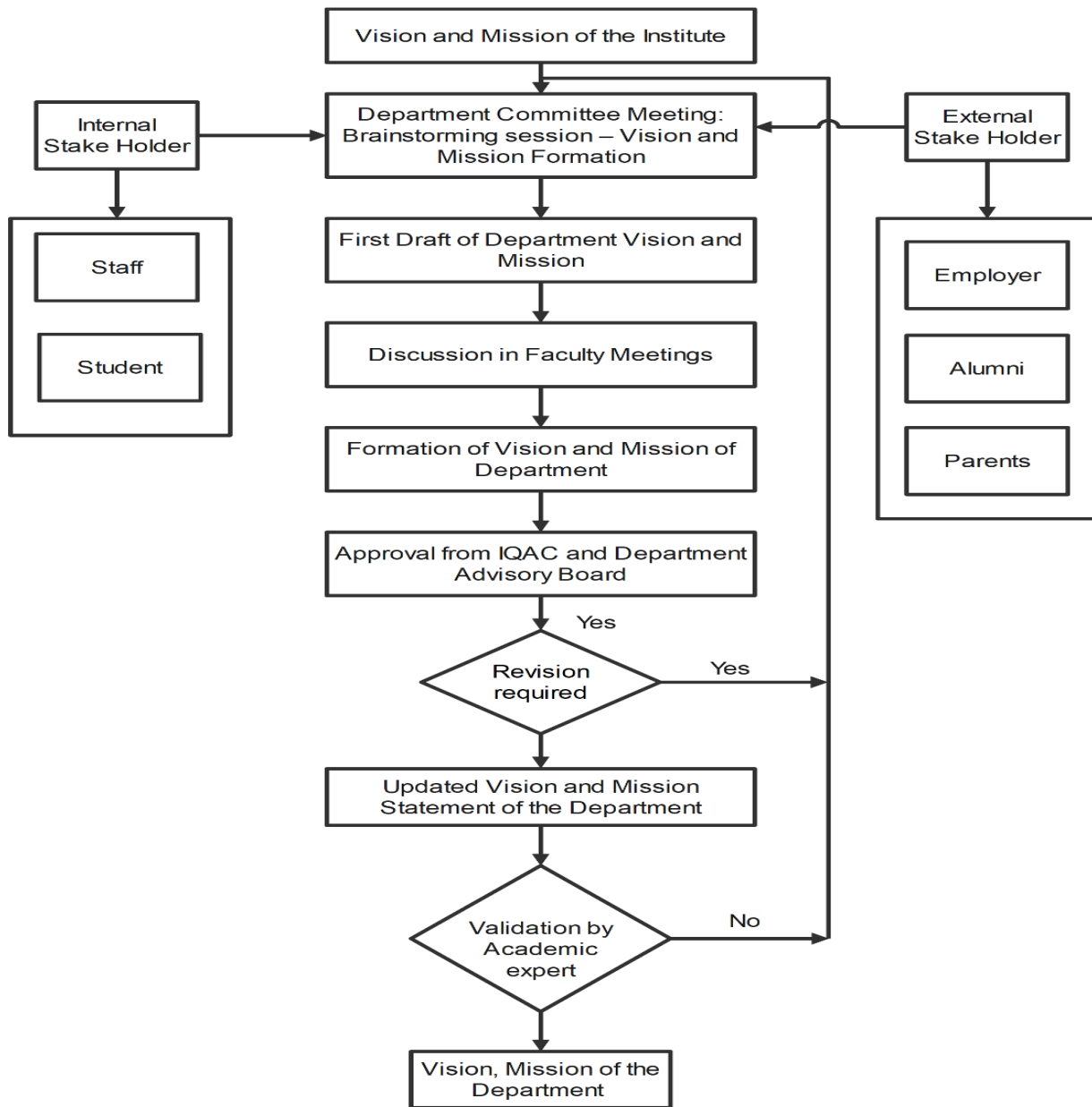
**Step 2:** The vision and mission statements, defined as stated in step-1 are shared with faculties, students, alumni, management and IQAC for the feedback.

**Step 3:** The feedback so obtained by the stake holders in step-2 are discussed among DC members before finalization.

**Step 4:** The new vision and mission statements (outcome of the DC meeting) are placed in Department Advisory Board (DAB) and IQAC for recommendation.

**Step 5:** Once the vision and mission statements are recommended by the IQAC/ Department Advisory board (DAB) they are validated by academic experts such as Board of studies Members and experts from university.

**Step 6:** Once the vision and mission statements are validated by the academic experts they are published on the institute website and other places.



**Figure 1.1: Process for defining Vision and Mission of the department**

**Process for defining Program Educational Objectives of the program:**

The program educational objectives are reviewed and finalized by the Department Advisory Board after a careful consideration of feed backs received from the internal and external stakeholders. The objective of the program is to produce globally competent Electronics and Telecommunication engineers possessing all round skills is the prime objective of this program.

**Department of Electronics and Telecommunication Engineering**

The Program Educational Objectives are established through a consultation process involving the core constituents such as students, alumni, industry experts, faculties and employers as shown in

Figure 1.2. The PEOs are established through the following process steps:

**Step 1:** Vision and Mission of the department are taken as basis to interact with various stake holders and graduate attributes defined by NBA are also kept in view. The PEOs are initially defined considering the following:

- Vision, mission statements of the institute/department, program outcomes
- Feedback from alumni.
- Expectations of parents/aspirants of the program.

**Step 2:** The first draft of PEOs is formed in line with PEO's defined by Mumbai University in revised syllabus. The first draft of PEO's is discussed among faculties, current students, alumni, parents, departmental advisory board and members of DC. The feedback from all of them is considered for refining the same.

**Step 3:** The PEOs from step 2 are submitted to IQAC and departmental advisory board for discussion and feedback. Once the advisory board and IQAC approve the PEOs, It will be finalized and published.

**Step 4:** Attainment of the stated PEOs is checked through survey of employers of our students and alumni. Their views are considered while modifying PEOs in next cycle.

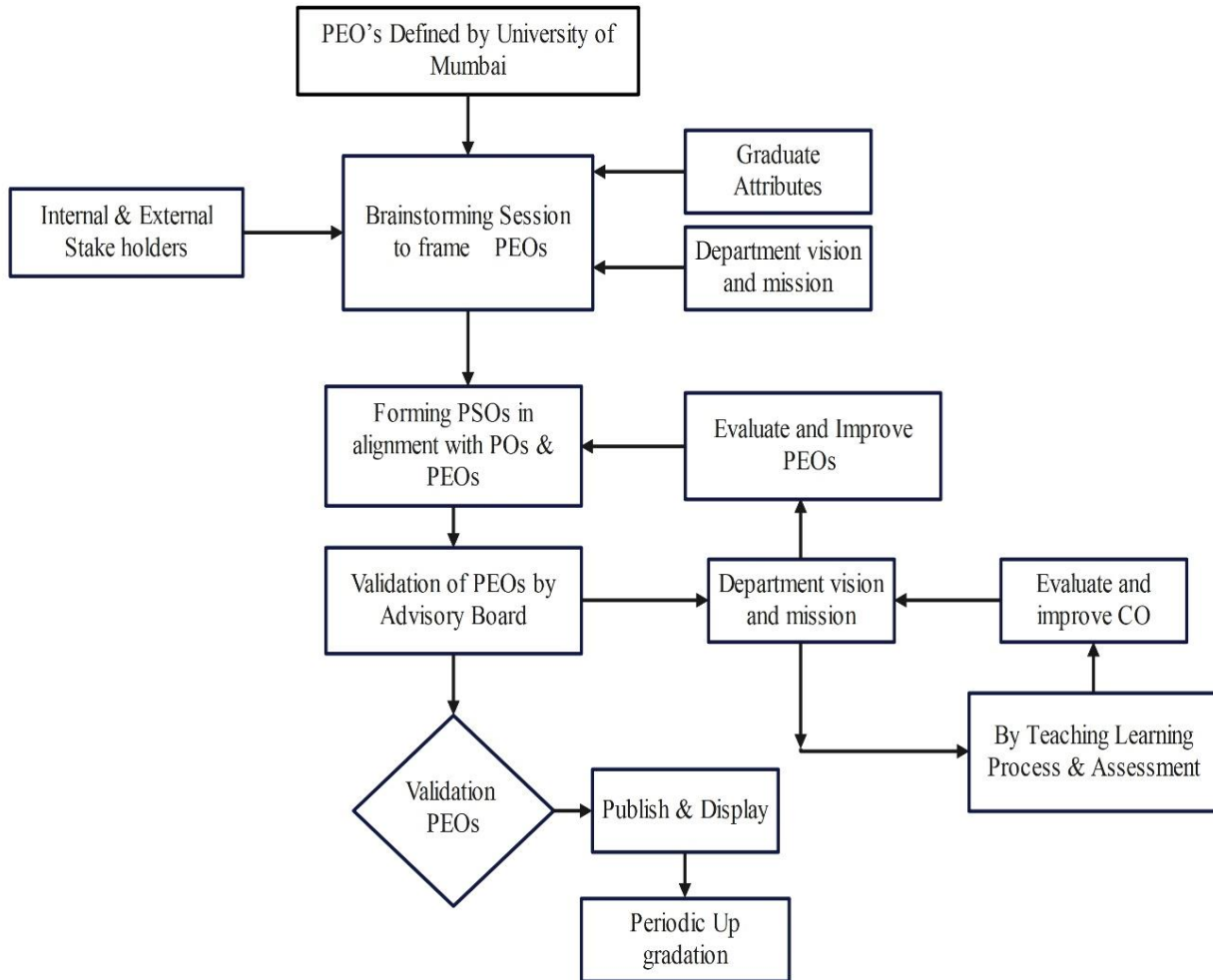


Figure 1.2 Process for Defining the PEOs of the Department

### Inputs considered for establishing the PEOs:

#### **Faculty interaction:**

The members of the teaching faculty as course coordinators play an important role in establishing PEOs. They are responsible for generating, altering and analyzing all the activities related to the achievement of the course outcomes.

#### **Alumni feedback:**

Alumni are those who have intimate knowledge of the programme and as such important in assessment of PEOs. Alumni feedback is obtained through alumni survey.

#### **Employer feedback:**

Corporate insight/performance of the graduates with other employees of the organization is through employer feedback

## 2. Curriculum Alignment and Gap Analysis

### Procedure for CO PO Mapping

#### Course Outcome Assessment and Attainment:

Each subject has Course outcomes (COs). These COs can be mapped with POs & PSOs based on Competencies and Performance Indicators given by AICTE Examination Reforms. Each COs can be assessed using Direct assessment tools that reflect the knowledge level and skills of the students based on their performance in Continuous Assessment Test, Assignments, Tutorials, Concept Test, Rubrics etc. This Direct assessment is taken to attain individual Course Outcomes (COs).

#### CO-PO Mapping:

POs give useful guidance at the program level for the curriculum design, delivery and assessment of student learning. However, they represent fairly high-level generic goals that are not directly measurable. Real observability and measurability of the POs at course level is very difficult. To connect high-level learning outcomes (POs) with course content, course outcomes and assessment, there is a necessity to bring further clarity and specificity to the program outcomes. This can be achieved through the following two-step process of identifying Competencies and Performance Indicators (PI).

- (1) Identify Competencies to be attained: For each PO define competencies—different abilities implied by program outcome statement that would generally require different assessment measures. This helps us to create a shared understanding of the competencies we want students to achieve. They serve as an intermediate step to the creation of measurable indicators.
- (2) Define Performance Indicators: For each of the competencies identified, define performance Indicators (PIs) that are explicit statements of expectations of the student learning. They can act as measuring tools in assessment to understand the extent of attainment of outcomes. They can also be designed to determine the appropriate achievement level or competency of each indicator so that instructors can target and students can achieve the acceptable level of proficiency. Figure 2.1 shows connection of POs to assessment.

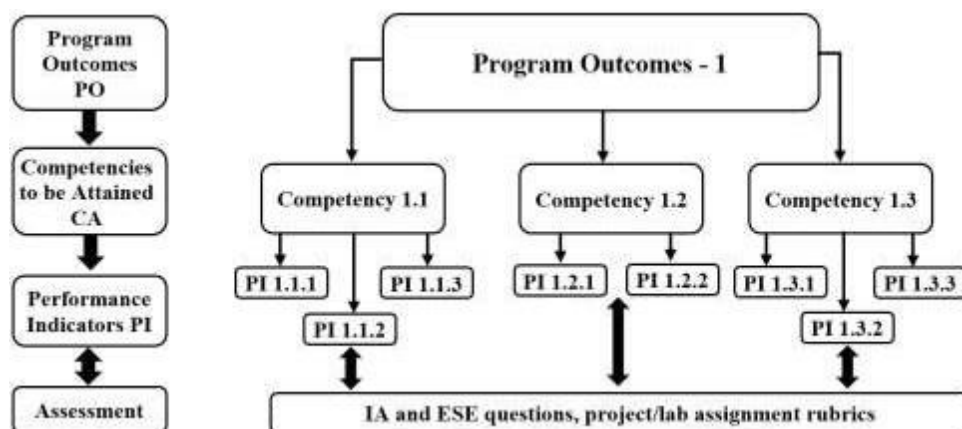


Figure 2.1 Connecting POs to Assessment

## Improving Structure and Quality of Assessments

For improving the structure and quality of assessment in various engineering programs following points are taken into consideration:

1. In Indian engineering education system, written examinations play a major role in assessing the learning and awarding of grades to the student. Universities and colleges give highest weightage to the outcomes of the written examinations in overall grading. Questions raised in the examination/test papers play an important role in defining the level of learning the student is expected to achieve in the courses and hence in the program. Since assessment drives learning, the design of question papers needs to go beyond the mere test of memory recall. They also need to test higher-order abilities and skills.
2. Written examinations assess a very limited range of outcomes and cognitive levels. Particularly in the courses, where course outcomes (COs) cover a broad range of expectations, written examinations alone will not be sufficient to make valid judgements about student learning. A wide range of assessment methods (e.g., term papers, open-ended problem-solving assignments, course/lab project rubrics, portfolios etc.) are employed to ensure that assessment methods match with learning outcomes.
3. As advised in AICTE Exam Reform Policy Document, assessment plans for each of the course in the program brings clarity to the following:
  - a. Alignment of assessment with learning outcome of the course
  - b. Level of learning (cognitive) student is expected to achieve
  - c. Assessment method to be adapted

The following figure discuss the application of Bloom's taxonomy framework to create the optimal structure of examination papers to test the different cognitive skills.

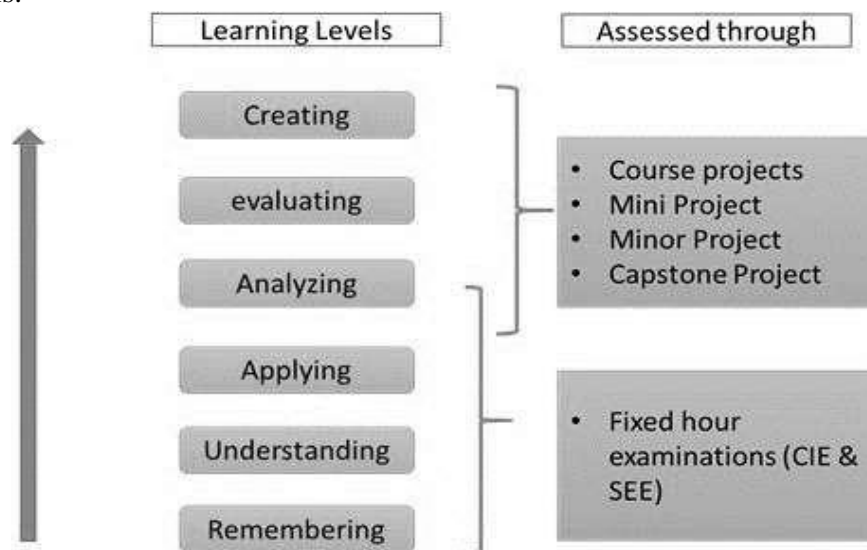
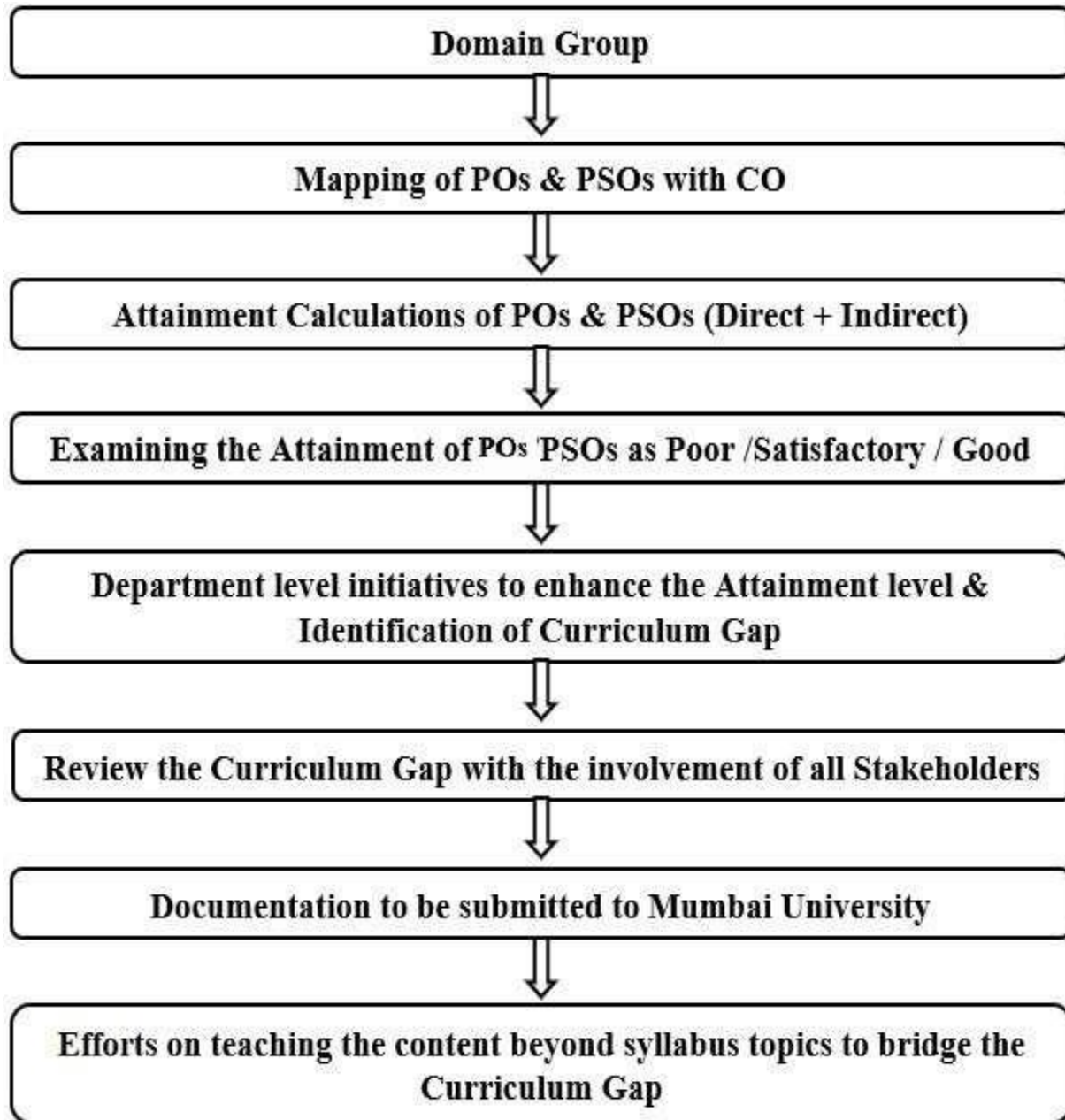


Figure 2.2: Assessment methods for different Bloom's cognitive levels

**Process to identify and bridge the Curriculum gaps**



**Figure 2.3: Process to identify and bridge the Curriculum gaps**

**The process for identifying & bridging the curriculum gap is depicted in Figure 2.3**

- As per university prescribed syllabus Domain groups are formed and
- There are course outcomes (COs) for every subject. Based on the competencies and performance indicators provided by the AICTE Examination Reforms, these COs can be mapped with POs and PSOs. Direct assessment tools are available for each CO to evaluate. These tools show the students' knowledge and abilities depending on how well they do on tests, assignments, tutorials, concept tests, rubrics, and other forms of continuous assessment. In order to achieve each course's specific outcomes, a direct evaluation is required (COs)
- . Using an articulation matrix, the target level is defined.
- Both direct and indirect tools are used in attainment estimations
- By looking at POS and PSO accomplishment and classifying them as good, satisfactory, or poor.
- New initiatives are taken to identify curriculum Gap and for enhancing attainment level.
- It comprises conversing with alumni and industry experts and asking feedback. Parental feedback aids in the process of identifying curriculum gaps. Members of the Department Advisory Board also contribute to the identification of curriculum gaps. The agenda for the Advisory Board meeting involves defining the curricular gap and exploring into the techniques needed to address it.
- Interactions with IITs, NITs, and other prestigious institutions at conferences, STTPs, FDPs, and course work, on the other hand, serve as the foundation for detecting curriculum shortcomings.
- The University of Mumbai's Board of Studies is informed of any identified curriculum deficiencies so that the next syllabus revision can take place.
- A gap between the curriculum and industry requirements has been identified,
- Adequate activities are being implemented to encourage industry participation in content delivery.
- Aims are being made to teach topics beyond the syllabus in order to close the gaps in the curriculum. Aims are being made to teach topics beyond the syllabus in order to close the gaps in the curriculum.



- NPTEL's local chapter for expanded learning Industry expert guest lectures, Content Delivery Expert guest lectures for SE, TE, and BE courses, as well as IETE and IEEE local chapter events such as industrial-cum-educational tours, are all available. Python, IoT, Robotics, Latex, Android programming, Proteus PCB designing, embedded system, raspberry pi, Cloud computing, Cyber security, Social workshops such as, Yoga Meditation, and a Seminar on Stress Management Through Diet Control, Expert lecture from CETTM, Mumbai, Participation in state and national level sports, video lectures from IIT Kharagpur, MIT USA. Workshop or seminar on Start-up, incubation and Entrepreneurship. The MHRD's "SWAYAM" technology is now available for self-learning to be accessed by anyone, anywhere at any time. State level **Techno vision** was conducted in Association with IEEE, Mumbai.

**Identified curricular gaps**

| Sr. No | Engineering year | Domain                           | Identified curriculum Gaps                                    |
|--------|------------------|----------------------------------|---|
| 1      | Second year      | VLSI                             | Prospects for the VLSI Field in the Future                    |
|        |                  | Analog circuits                  | Use of modern tools, Proteus                                  |
|        |                  | Entrepreneurship                 | Start-up, incubation and Entrepreneurship                     |
| 2      | Third year       | Project /mini project            | Lack of familiarity with modern typesetting language (Latex)  |
|        |                  | All 7 Domain                     | Use of modern tools, Proteus                                  |
|        |                  | Data Analytics                   | Modern technology tools and techniques used in AIML           |
|        |                  | T &P                             | Career planning and promotion, as well as resilience building |
|        |                  | Entrepreneurship                 | Start-up, incubation and Entrepreneurship                     |
| 3      | Final Year       | Basic and Advanced Communication | Telecommunications practical exposure and live demonstration  |
|        |                  | Data Analytics                   | Latest trends in the industry                                 |
|        |                  |                                  | Modern technology tools and techniques used in HAIML          |
|        |                  | All 7 domains                    | Modern technology trends and techniques                       |
|        |                  | T & P                            | Career planning and promotion, as well as resilience building |
|        |                  | Entrepreneurship                 | Start-up, incubation and Entrepreneurship                     |

### 3. Beyond the Syllabus

4. PO & PSO Assessment and Attainment:
5. PO assessment tools are categorized into Direct method and Indirect method. The final PO attainment is calculated by taking 80% of the attainment values from Direct assessment method and 20% of the attainment values from Indirect assessment method.
6. Direct Method:
7. · Once the overall attainment percentage of each COs is calculated, the PO and PSO attainment is calculated by taking the cumulative average of all the course's CO attainment which contributes to the Program Outcomes and Program Specific Outcomes.
8. · The overall CO attainment values are calculated for all the direct assessment tools. For theory and practical courses, for R2019, Overall CO attainment is calculated using the following Overall attainment of COs (Theory) =  $0.2 \cdot \text{IA attainment} + 0.8 \cdot \text{ESE attainment}$  Overall attainment of COs (Practical & Project) =  $0.2 \cdot \text{CA attainment} + 0.8 \cdot \text{ESE attainment}$
9. Step 2: Calculation for Direct Attainment for CO-PO Mapping
10. 1. Direct Tools:
11. · Internal Assessment I & II
12. · Assignments
13. · Tutorials
14. · Experiments
15. · Subject / Course Project
16. · Industrial Visits
17. · Presentation
18. · Final University Examination (Subject / Oral / Practical)
19. Note: High Scoring subjects can elevate the attainment level with justification (If the results are observed consistently high, No failures or Number of failures are less, any other) for a particular course.
20. Enter the data of each student:

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**Details of the content beyond the syllabus for the attainment of POs and PSOs**

(Provide details of the additional course/learning material/content/laboratory


Experiments/ projects etc., arising from the gaps identified in 2.1.1 in a tabular form in the Format given below)

**Activities to bridge curriculum gap 2023-2024**

| Sr. No. | Gap  | Action Taken                                    | dd/mm/yyyy  | Resource Person with Designation  | No. of Students Attended | Relevance to POs, PSOs                               |
|---------|--|---|---|---|--------------------------|--|
| 1       | Employability and Career Readiness   | One-Day Seminar on Resume Building              | 2 <sup>nd</sup> August, 2023                      | Dr Nikhil Gala<br>(Chairman, Corporate Relations & Placements, NMIMS - MPSTME)                          | 100                      | PO6, PO9, PO10, PO12                                 |
| 2       | Lack of familiarity with modern typesetting languages (Latex, In Design)                   | Two-Day LaTeX on Resume Building                | 4 <sup>th</sup> , 7 <sup>th</sup> August, 2023    | Mrs Apurva Dhotre   | 100                      | PO8, PO9, PO10, PO11, PO12                           |
| 3       | Modern tools and techniques used in AIML   | One-Day Hands on Training on AI & ML            | 8 <sup>th</sup> September, 2023                   | Mr Hannan Satopay<br>(CEO, Alhansat Technology)   | 60                       | PO1, PO2, PO3, PO4, PO5, PO12                        |
| 4       | Modern technology trends and techniques  | One Day Seminar on Cyber Security               | 8 <sup>th</sup> , 9 <sup>th</sup> September, 2023 | Mr Sachin Dhedia<br>(Founder and CEO of Skynet Secure solutions)  | 30                       | PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO12, PS01,  |
| 5       | Modern tools and techniques used in IT industry  | One-Day Seminar on Block chain Technology       | 3 <sup>rd</sup> October, 2023                     | Mr R. Sundararajan<br>(Director, Yunometa)  | 80                       | PO2, PO3, PO5, PO6, PO8, PO11                        |
| 6       | Use of modern tools, industry-specific IoT apps  | Two-Day Hands-on training on Internet of Things | 6 <sup>th</sup> , 7 <sup>th</sup> October, 2023   | Prof. Sandeep Mishra<br>(Asst Professor, KJ Somaiya Institute of Technology)                            | 50                       | PO1, PO2, PO3, PO5, PO9, PS01, PS02                  |
| 7       | Modern technology trends and techniques  | One-Day Hands on Training on Flutter            | 13 <sup>th</sup> October, 2023                    | Mr Saksham Avasthi<br>(Active Flutter Developer with experience of 3 years)                             | 50                       | PO1, PO2, PO3, PO5, PO6, PO11, PO12, PS01, PS02      |
| 8       | Use of modern tools.   | Two-Day Seminar on PCB Designing                | 14 <sup>th</sup> , 15 <sup>th</sup> October, 2023 | Mr Amit Yadav<br>(Vice-Chairperson of IETE RGIT)<br>and<br>Mr Aditya Wavale<br>(President of AERO RGIT) | 40                       | PO1, PO2, PO3, PO5, PO6, PO9, PO11, PO12, PS01, PS02 |
| 9       | Knowledge of International Universities' Course Availability and Higher Education Criteria | One-Day Study Abroad Seminar                    | 18 <sup>th</sup> October, 2023                    | College Pond Overseas Education Consultant  | 80                       | PO5, PO7, PO10, PO12, PS02                           |

  
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| Activities to bridge curriculum gap 2022-23 |  |  |   |   |                          |   |
|---|--|--|---|---|--------------------------|---|
| Sr. No.                                     | Gap  | Action Taken   | dd/mm/yyyy  | Resource Person with Designation  | No. of Students Attended | Relevance to POs, PSOs                        |
| 1   | Innovation, Start-up, awareness                  | Workshop on Design Thinking, Critical thinking and Innovation Design   | 1 <sup>st</sup> Feb 2022  | Mr. Atul Kurani, Vice President, Capgemini<br>Mr. Sethu Madhavan, Chief Executive Officer, CEMS<br>Mr Rahul Sehgal, Head Of Technology, CEMS<br>Mr Rahul Sahegal<br>Head Sales and Marketing, Design Tech sys Ltd, Bangalore                          | 200                      | PO1,PO3,PO6, PO7,PO8,PO10, PO11,PO12          |
| 2   | Innovation, Start-up, Entrepreneurship awareness | Workshop on Entrepreneurship Skill, Attitude and behaviour Development.  | 2 <sup>nd</sup> Feb 2022  | Mr. Aamir Mulani, Co-founder and CEO of Playbox TV.<br>Mr. Ashish Shukla, Head of CIEE<br>Mr. Rajesh Navghare, RGIT Alumni<br>Mr. Nabeel Akhtar, RGIT Student   | 191                      | PO1,PO3,PO6, PO7,PO8,PO10, PO11,PO12          |
| 3   | Project design and development upgradation       | Intra Institutional Hackathon and Reward Best Innovations  | 3 <sup>rd</sup> Feb 2022  | Manage through YUKTI-NIR  | 200                      | PO1,PO3,PO2, PO4,PO5,PO6, PO9,PO10, PO11,PO12 |
| 4   | Enhancing soft skills                            | “Poster Presentation on Innovative ideas” (Intra Institutional Innovation Competition and Reward Best Innovations0 | 3 <sup>rd</sup> Feb 2022  | Name of Judges<br>1. Prof. Amol Mangrulkar, Rajiv Gandhi Institute of Technology , IIC Innovation Ambassador (IA) (Inter Judge)<br>2. Dr. Vinayak H Khatawate, D. J. Sanghvi College of Engineering , IIC Innovation Ambassador (IA) (External Judge) | 42                       | PO6,PO10,PO12                                 |
| 5   | Employability and soft skills development        | How to convert campus that creates successful Innovation and Entrepreneurship                                      | 10 <sup>th</sup> August 2022  | Mr. Saurabh Sinha, Founder and managing partner, Rein labs , Navi Mumbai  | 103                      | PO1,PO3,PO6, PO7,PO8,PO10, PO11,PO12          |
| 6   | Power plant observation and understanding        | Industrial Visit at ADTPS Adani - Dahanu Thermal Power Station   | 12 <sup>th</sup> August 2022  | ADTPS Adani - Dahanu Thermal Power Station people   | 49                       | PO1,PO3,PO6, PO7,PO8,PO10, PO11,PO12          |
| 7   | Modern technology updating                       | Millennials in STEM  | 30 <sup>th</sup> August 2022  | Mr Dinesh Vishwakarma<br>Sr Security Consultant, Ernst & Young Global Limited   | 24                       | PO6,PO12                                      |
| 8   | Innovation, Start-up, Entrepreneurship awareness | A Motivational Session By A Successful Entrepreneur  | 8 <sup>th</sup> September 2022  | Mr. Chandan Biswas, IIT MADRAS ALUMNI and Founder of Chemisphere  | 106                      | PO1,PO3,PO6, PO7,PO8,PO10, PO11,PO12          |
| 9   | Use of modern tools, industry-specific IoT apps  | Three-Days Training workshop on Internet of Things   | 23 <sup>rd</sup> , 24 <sup>th</sup> , 25 <sup>th</sup> September 2022 | Prof. Manoj Kavedia, Associate Professor at Thadomal Shahni Engineering College)  | 75                       | PO1,PO3,PO9, PO11 PO12, PSO1,PSO2             |

  
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|    |  |   |  |  |          |                                       |
|----|--|---|--|--|----------|---------------------------------------|
| 10 | Industry-specific applications related to Mobile communications                            | Industrial visit at MTNL  | 26 <sup>th</sup> , 30 <sup>th</sup> September 2022 | MTNL POWAI   | 80       | PO1,PO2,PO6, PO7,PO8,PO12, PSO1,PSO2  |
| 11 | Innovation, Start-up, Entrepreneurship awareness   | Workshop on Entrepreneurship and Innovation as Career Opportunity | 29th September 2022                                | Luvai Darwajawala, Founder of We-Moove and co-founder of Blockwee<br>Ayush Panchmiya ,Co-founder of Blockwee | 110      | PO1,PO3,PO6, PO7,PO8,PO10, PO11,PO12  |
| 12 | Utilization of modern tools and technology, Opportunities                                  | One-Day webinar on Metaverse and Technology                       | 30 <sup>th</sup> September 2022                    | Mr. Abdul Basit<br>Founder and CEO, HOLO Abdul   | 120      | PO5, PO6, PO12                        |
| 13 | Modern technology tools and techniques used in Green Technologies                          | One-Day seminar on Go-Green Technologies                          | 6 <sup>th</sup> October, 2022                      | Dr. Y.S. Rao,<br>Vice Principal at Sardar Patel Institute of Technology                                      | 120      | PO6,PO7, PO12                         |
| 14 | Training Particular to the Industry, Appropriate Opportunities                             | One-Day seminar on network security                               | 6 <sup>th</sup> October, 2022                      | Mr. Shiv Chawla, Senior Manager at IT Network, MTNL  | 120      | PO1,PO5, PO6,PO12                     |
| 15 | Employability and Career Readiness   | One-Day seminar for TOEFL GRE exams                               | 11 <sup>th</sup> October, 2022                     | Mrs. Sanhita Bhattacharya<br>Senior Counselor  | 100      | PO1,PO6, PO8,PO12                     |
| 16 | Latest trends in the industry  | One-Day webinar on Python Programming                             | 11 <sup>th</sup> Oct 2022                          | Ms. Jaya Varma   | 40       | PO1,PO2,PO5, PO12,PO6, PO10,PO11      |
| 17 | Career planning and promotion, resilience development                                      | Two-Day online International programming competition              | 22 <sup>nd</sup> – 23 <sup>rd</sup> October, 2022  | IEEE Team Members  | 13 Teams | PO1,PO2,PO3, PO4,PO12                 |
| 18 | Latest trends in the industry  | 1-day workshop on Adobe Photoshop                                 | 22 <sup>nd</sup> Dec 2022                          | Mr. Rohit Upadhyay<br>Mr. Prathamesh Dave  | 50       | PO5,PO6,PO10 PO12                     |
| 19 | Knowledge regarding LinkedIn   | 1-Day Seminar on LinkedIn and Resume building                     | 16 <sup>th</sup> Jan 2023                          | Ms. Sweta Kumari<br>Ms. Sakshi Keriya  | 50       | PO1, PO5, PO6,PO10, PO12              |
| 20 | IPR awareness among students   | IPR Mining  | 11 <sup>th</sup> Feb 2023                          | Mr. Mandar S. Chihakle Manage Patent Attorney<br>& Mr. Avinash B. Karande. Sr Patent Attorney                | 110      | PO1,PO3,PO4, PO6,PO8 ,PO10,PO11, PO12 |
| 21 | Knowledge of International Universities' Course Availability and Higher Education Criteria | One-Day Seminar for higher studies abroad.                        | 13 <sup>th</sup> February, 2023                    | Mrs. Bhaktawar Krishnan,<br>Founder & Director of INSPIRUS Education.  | 100      | PO1, PO6, PO12                        |

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|    |  |   |  |  |     |                                       |
|----|--|---|--|--|-----|---------------------------------------|
| 22 | Latest trends in the industry                                      | Two-Day Workshop on Block chain using Bitcoin                               | 16 <sup>th</sup> ,17 <sup>th</sup> February 2023                                 | Mr. Asad Memon<br>PAPA success coach   | 60  | PO1,PO2,PO3, PO4, PO5                 |
| 23 | Research Methodology and Technical Writing.                        | Two-Day Workshop on Elements of Research Methodology and Technical Writing. | 25 <sup>th</sup> , 26 <sup>th</sup> February, 2023                               | Dr. Saurabh Mehta<br>Professor at Vidyalankar Institute of Technology            | 40  | PO1,PO4, PO10, PO12                   |
| 24 | Latest trends in the industry                                      | Workshop on HFSS Software   | 27 <sup>th</sup> ,28 <sup>th</sup> Feb 2023                                      | Prof. Surendra Sutar   | 80  | PO1,PO2,PO3, PO4,PO5, PO12,PSO1, PSO2 |
| 25 | IPR awareness among students                                       | Awareness progress on intellectual property rights                          | 28 <sup>th</sup> Feb 2023  | Mr K. Naryanmurty, Patent & Design Examiner Officer, NIPAM, Government of India. | 110 | PO1,PO3,PO4, PO6,PO8 ,PO10,PO11, PO12 |
| 26 | Industry-specific applications related to Satellite communications | Industrial visit at BSNL  | 1 <sup>st</sup> , 6 <sup>th</sup> , 11 <sup>th</sup> , 14 <sup>th</sup> Mar 2023 | BSNL Earth Station   | 130 | PO1,PO6,PO7, PO8,PO12, PSO1,PSO2      |
| 27 | Recent trends and developments in the concept of Web Designing     | Workshop on Web Development   | 1 <sup>st</sup> , 4 <sup>th</sup> , 11 <sup>th</sup> , 18 <sup>th</sup> Mar 2023 | Mr. Harshraj<br>(from Autum Tech Labs)   | 30  | PO1,PO2,PO3, PO4, PO5,P12             |
| 28 | Latest trends in the industry                                      | 45-day Online workshop on software simulation and robot manufacturing.      | 8 <sup>th</sup> March, 2023 to 22 <sup>nd</sup> April, 2023                      | Mr. Mohit<br>JU Makerspace   | 65  | PO1, PO3, PO11, PO12, PSO2            |
| 29 | Technical Paper Presentation                                       | Two Day Competition on Technical Paper Presentation                         | 23 <sup>rd</sup> , 24 <sup>th</sup> March, 2023                                  | IEEE Team Members  | 60  | PO1,PO2,PO4, PO9, PO10,PO12           |
|    | Technical Poster Presentation                                      | One Day Competition on Technical Poster Presentation                        | 23 <sup>rd</sup> Mar 2023  | IETE MEMBERS   | 20  | PO3,PO9, PO10,PO11                    |
|    | Technical Poster Presentation                                      | One Day Project Presentation  | 24 <sup>th</sup> March 2023  | IETE MEMBERS   | 20  | PO3,PO9,PO10, PO11, PO12              |
|    | Project Competition  | One Day Project Competition cum Exhibition                                  | 8 <sup>th</sup> April, 2023  | IEEE Team Members  | 180 | PO1,PO2,PO3, PO5,PO9,PO10 PO11,PO12   |
|    | Innovation, Start-up, Entrepreneurship awareness                   | Field/Exposure Visit to Incubation Unit.                                    | 1 <sup>ST</sup> August 2023  | Sardar Patel Technology Business Incubator (SPTBI), Mumbai                       | 20  | PO1,PO3,PO6, PO7,PO8,PO10, PO11,PO12  |

  
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| Activities to bridge curriculum gap 2021-2022 |  |  |   |  |                                |   |
|---|--|--|---|--|--------------------------------|---|
| Sr. No.                                       | Gap  | Action Taken   | dd/mm/yy<br>yy                                  | Resource Person<br>with Designation  | No. of<br>Students<br>Attended | Relevance to POs, PSOs  |
| 1   | IPR awareness among students   | Awareness progress on intellectual property rights             | 28 <sup>th</sup> Feb 2023                       | Mr K. Naryanmurty,<br>Patent & Design<br>Examiner Officer,<br>NIPAM,<br>Government of India. | 110                            | PO1,PO3,PO4,<br>PO6,PO8<br>,PO10,PO11,PO12                        |
| 2   | Knowledge of International Universities' Course Availability and Higher Education Criteria | 1 Day RGIT Edu-Fair-2021                                       | 31 <sup>st</sup> Aug, 2021                      | Imperial Overseas Education Consultants  | 150                            | PO8, PO10<br>PSO2   |
| 3   | Recent trends in electronic vehicles and modern technologies used                          | One day workshop on Fundamentals of Electronic vehicles        | 6 <sup>th</sup> Sept, 2021                      | Mr. Ujjwal Kumar Sen   | 100                            | PO1,PO2,PO3<br>PO4,PO5, PO7,PO9,<br>PO11,PO12,PSO1,PSO2           |
| 4   | Modern technology trends and techniques  | 1 Day Workshop on Game Development                             | 10 <sup>th</sup> Sept 2021                      | Experts from Outscal   | 150                            | PO1, PO2, PO3,<br>PO5, PO6, PO9 PO10,<br>PO12, PSO1, PSO2         |
| 5   | Use of modern tools and technologies   | 2 Days Proteus Workshop  | 23 <sup>rd</sup> Sept, 7 <sup>th</sup> Oct 2021 | Mr. Swapnil Bhisale<br>Mr. Devdutta Indulkar<br>Ms. Nandita Attawar                          | 76                             | PO1, PO2, PO3<br>PO4, PO5,<br>PO7, PO9, PO11, PO12,<br>PSO1, PSO2 |
| 6   | Modern technology trends and techniques  | 1 Day Webinar on Automating Space Exploration using Python     | 25 <sup>th</sup> Sept, 2021                     | Mr. Soutik Nandy,<br>Chief Information<br>Technology Officer,<br>SpaceNova                   | 150                            | PO1, PO2, PO5,<br>PO9, PO12                                       |
| 7   | Career Readiness, Modern tool usage, Industry specific application related to python       | Digital Marketing Internship                                   | 25 <sup>th</sup> Sept, 2021                     | Mr. Vatsal Shanghvi  | 100                            | PO9, PO12,  |
| 8   | Employability and Career Readiness   | One-Day 1 Webinar on Profile Building for Higher Education     | 11 <sup>th</sup> Oct, 2021                      | CollegePond Overseas Education Consultant  | 150                            | PO8, PO10   |
| 9   | Career Readiness and Employability Skills  | Latex Workshop   | 11 <sup>th</sup> Oct, 2021                      | Dr. Sanjay S. Shitole  | 50                             | PO8, PO9, PO10, PO11,<br>PO12                                     |
| 10  | Career Readiness and Employability Skills  | One-Day 1 Webinar on Resume building and Interview preparation | 16 <sup>th</sup> Oct, 2021                      | Mr. Pratik Upadhyaya   | 50                             | PO1, PO5, PO6, PO10,<br>PO12                                      |
| 11  | Career planning and promotion, resilience development                                      | One-Day Online International Coding Competition                | 23 <sup>rd</sup> Oct, 2021                      | IEEE Team Members  | 20                             | PO2, PO3, PO5, PO6,<br>PO9  |
| 12  | Career preparation and advancement, Resilience building                                    | HFSS Workshop  | 23 <sup>rd</sup> Oct, 2021                      | Prof Surendra Sutar  | 80                             | PO1,PO2,PO3,PO4,<br>O5,PO12,PSO1,PSO2                             |

  
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 Permanently Affiliated to University of Mumbai)  
**Department of Electronics and Telecommunication Engineering**

| IETE Activities 2020-2021 |   |   |  |  |                          |  |
|---------------------------|---|---|--|--|--------------------------|--|
| Sr. No.                   | Gap   | Action Taken  | dd/mm/yyyy   | Resource Person with Designation   | No. of Students Attended | Relevance to POs, PSOs                                     |
| 1                         | Career Readiness and Relevant Opportunities                         | One Day Panel Discussion                                | 9 <sup>th</sup> August 2020  | 1)Dr. Sanjay Bokade<br>2)Mr. Sandip Kadtane<br>3)Mr. P. Pentayya<br>4)Mr. Uday Bhaskarwar<br>5)Mr. Neeraj Shah<br>6)Mr. Devdatta V. Rokade | 400                      | PO1,<br>PO8, PO9,<br>PO10, PO12                            |
| 2                         | Knowledge of Data Science and Deep Learning                         | One Day Seminar on Data Science & Deep Learning         | 12 <sup>th</sup> September 2020  | Mr. Rahul Aggarwal   | 110                      | PO1,PO2,PO3<br>PO4,PO5,PO6<br>PO7,PO9, PO11,PO12           |
| 3                         | Use of modern tools and technologies                                | Six days Workshop on Proteus Software                   | 28 <sup>th</sup> September 2020<br>5 <sup>th</sup> , 12 <sup>th</sup> , 14 <sup>th</sup> , 15 <sup>th</sup> ,<br>16 <sup>th</sup> October 2020 | Mr. Karan Gupta  | 60                       | PO1,PO2,PO3<br>PO4,PO5,<br>PO7,PO9,<br>PO11,PO12,PSO1,PSO2 |
| 4                         | Usage of modern tools, software not in the syllabus                 | 4 Day Workshop on Adobe Photoshop                       | 10 <sup>th</sup> , 11 <sup>th</sup> , 17 <sup>th</sup> , 18 <sup>th</sup><br>October 2020  | Mr. Abhijeet Bhise<br>Ms. Crystal Fernandes<br>Mr. Ankit Bhowad  | 150                      | PO9, PO12,   |
| 5                         | Recent trends and developments in the concept of Big Data Analytics | 1 Day Workshop on BDA (Big Data Analytics)              | 30 <sup>th</sup> January 2021  | Mr. Sandip Patil   | 40                       | PO1,PO2,PO3<br>PO4,PO5,PO6<br>PO7,PO9, PO11,PO12           |
| 6                         | Scope related to Electronics & Telecommunication industry           | Know Your Department: FE Induction                      | 6 <sup>th</sup> February 2021  | Dr. S.D. Deshmukh (HOD EXTC Department)  | 120                      | PO12, PS01, PSO2   |
| 7                         | Scope related to Electronics & Telecommunication industry           | Know Your Department: SE Induction                      | 18 <sup>th</sup> February 2021   | Dr. S.D. Deshmukh (HOD EXTC Department)  | 100                      | PO12, PS01, PSO2   |
| 8                         | Recent trends in electronic vehicles and modern technologies used   | One day workshop on Fundamentals of Electronic vehicles | 5 <sup>th</sup> March, 2021  | Mr Karan Gupta<br>Mr Vinay Bhatt   | 100                      | PO1,PO2,PO3<br>PO4,PO5,<br>PO7,PO9,<br>PO11,PO12,PSO1,PSO2 |
| 9                         | Knowledge of Web development  | Four days workshop on web development                   | 27 <sup>th</sup> , 28 <sup>th</sup> March 2021<br>3 <sup>rd</sup> April, 2021  | Ms Navya Shergar<br>Ms Pooja Palekar   | 130                      | PO1,PO3,PO5,<br>PO6, PO9,PO11, PO12                        |



#### **4. Teaching-Learning Quality**

##### **The Institution adheres to the academic calendar for the conduct of Continuous Internal Evolution (CIE)**

Every year, the institute creates and publishes an academic calendar in accordance with Mumbai University requirements. The academic calendar for the academic year is prepared and published by the university, and it comprises plans for curricular and co-curricular activities based on the available working/teaching days per university standards.

The academic calendar is distributed to all faculties prior to the start of the semester. A teaching plan is created based on the academic calendar. The Institute's academic calendar contains a timetable of curricular delivery, Term Tests, a display of student attendance, technical and cultural events, submission, oral-practical examination, parent meeting, Alumni meeting, holiday list, and extracurricular activities. Students are given advance notice of the timetable and academic calendar. The academic schedule is carefully followed by the institute.

##### **Teaching Plan**

Each faculty member prepares a detailed course plan based on the syllabus prior to the start of the semester. Content, learning aids and methods, faculty approach, and course outcomes are all part of the course design. The course plan generally outlines the content and total number of lectures required to complete the curriculum. The HOD and Principal review the lesson plan on a regular basis.

##### **Timetable for the Laboratory**

The concerned academic members produce the laboratory timetable, which includes batch- specific information.

##### **Time Table**

The semester's timetable has been prepared and is available on the notice board and online. The HOD monitors the academic schedule's day-to-day operations. The teaching plan is created by the instructor and approved by the HOD. At the start of the course, the teacher briefs every student in the classroom.

In class, the teacher explains the uploaded content, provides extra information, and invites students to ask questions. In the case of problem-oriented subjects, he enlists the assistance of another teacher and assigns problems for students to solve in class.

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This is especially beneficial in this scenario because the lessons are given one-on-one, and the students shed any inhibitions they may have, assuring student-centric learning.

The numerous question arousals in class allow students to think and research at home, which promotes self-learning. The library has live video lectures from famous professors from reputed universities such as IITs, as well as free access to NPTEL lectures and CDs, reference books, and text books in adequate quantities. This encourages students to learn on their own.

The following activities are carried out at the departmental level to boost confidence, motivation, and teamwork.

|                                  |                       |                              |
|----------------------------------|-----------------------|------------------------------|
| • Self-learning                  | • Project competition | • Technical, Cultural events |
| • Tutorials/ Assignment          | • Group discussion    | • Seminars                   |
| • Professional bodies activities | • Industrial visits   | • Workshop                   |
| • Mock oral / viva               | • Mentorship scheme   | • Technical Competitions     |

The department uses an immersive learning method that incorporates multiple batches of students / groups of students doing different problem statements/designs/questions in the laboratory, which is evaluated at the conclusion of the semester. In each subject, students will be assigned a minimum of two assignments/tutorials per semester. As part of their laboratory performance, students are assigned mini projects in topics assigned by instructors. To improve group discussion and teamwork learning, students are assigned particular themes for seminar/case study in groups. All of the factors listed above are examined as part of their academic success. Students are encouraged to participate in inter-college technical and cultural activities, as well as a variety of technical activities. For areas not covered in the course, expert speeches, seminars, workshops, mini projects, and paper presentations were planned. Students are encouraged to participate in social events such as blood donation camps, Swachh Bharat Abhiyaan, Versova beach cleanups drive, and so on.

**Teaching and learning innovation and creativity**

Throughout the Institute's academic and allied activities, deliberate efforts are made to encourage critical thinking, creativity, and scientific temper among students, in accordance with the Institute's vision. The Institute aspires to have a transformational impact on students through comprehensive education by instilling qualities of competence, confidence, and excellence. The following activities are listed.

- **Critical Thinking**

Students are encouraged to enter national-level project competitions organized by other institutes

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and universities, such as the Smart India Hackathon. Students are encouraged to participate in activities that promote critical thinking, such as CAD Wars and Robo Wars. Industrial excursions are planned for students to have a practical understanding of how things work, allowing for more broad thinking. Other technical events/competitions were held.

- **Nurturing Scientific temper**

Expert lectures by industry professionals, scientists, and entrepreneurs are scheduled to share their experiences and make them aware of new technologies and industry practices. Students are encouraged to join professional societies and student forums such as IEEE, IETE, and ISTE, among others. Students who are interested in research and development are encouraged to present their work at various conferences/journals. Students are recognized for their exceptional performance in projects, research, and other relevant areas. Faculty members are also involved in research projects in collaboration with potential students, sharing their new ideas with these students.

- **Research forum, alumni guidance on occasion**

Faculty members are always experimenting with new instructional methods. The following are some of the innovative teaching methods used: During theory and practical classes, faculty members use computer simulation. Open, instructional, and E-learning resources, such as NPTEL, are used by faculty and students. On a regular basis, project-based learning and experiential learning such as field work, visits to industries, and guest lectures are organized. The institute also has a local chapter of NPTEL, which encourages students to pursue online certification courses. Students are given a reference book by well-known writers, as well as animation and video clips in class and study materials.

### **Innovations by the Faculty in Teaching and Learning**

Innovation in the teaching-learning process refers to the introduction of new and creative approaches, methods, and technologies to enhance the effectiveness and efficiency of the educational process. It involves adopting novel ways of designing and delivering instruction to facilitate better understanding, engagement, and retention of knowledge among students. By adopting innovative strategies, educators can enhance the quality of education, improve student outcomes, and prepare students for the challenges in this new era. An innovative teaching and learning process is required for students to understand the curriculum. This helps in bridging the gap between the curriculum and the Industry.

We follow these steps while deciding on the Innovation in Teaching Learning Process in RGIT

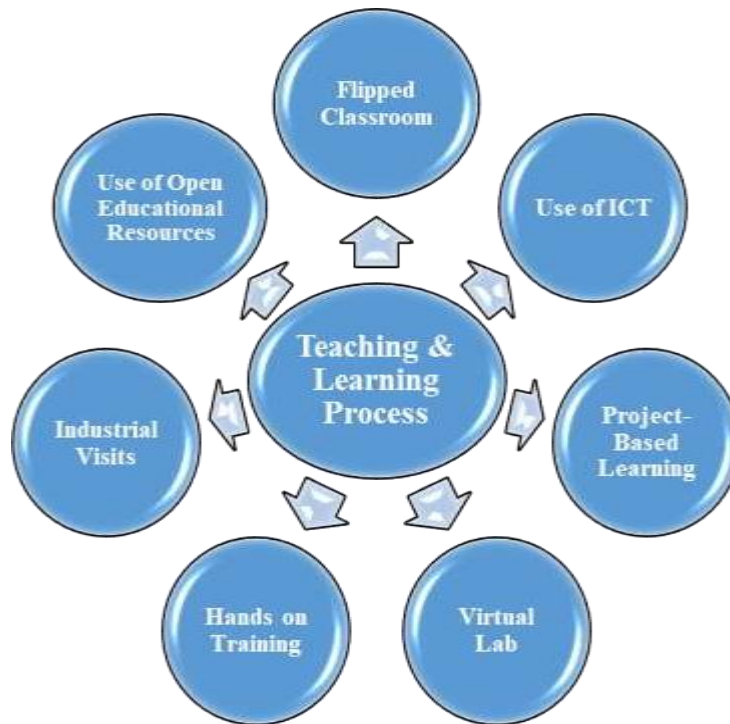


**Figure2.4: steps while deciding on the Innovation in Teaching Learning Process RGIT**

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In RGIT, the following methods are adopted in Innovation in teaching-learning methods are adopted by RGIT process

- ICT Classroom
- Flipped Classroom
- Project Based Learning
- Use of Open Education Resources
- Virtual Labs
- Industrial Visits
- Hands-on Training



**Figure2.5.: Various Teaching Learning Process**

**1. Use of ICT:**

**Idea:**

To provide interactive learning experiences, stimulates and motivates students to learn.

**Implementation:**

Faculty integrated educational apps or websites and create interactive assignments. Some of faculty members created their own YouTube channels.

**Outcome:**

ICT provides comfortable learning. ICT aids in the understanding of difficult concepts and processes.

## **2. Flipped Classroom:**

### **Idea:**

To familiarize students with the new information and prepare for in-class activities with the teacher and peers, ahead of time.

### **Implementation:**

The flipped classroom approach is reserved for revisiting the topic while the teacher actively engages with the students through group discussions, collaborative coursework, and assessments.

### **Outcome:**

Helps improve students' engagement and communication between the teacher and students as well as their peers. It provides the students with the opportunity to learn at their own pace.

## **3. Project-Based Learning:**

### **Idea:**

Project-based learning involves students working on real-world projects or authentic tasks that require them to apply knowledge and skills in meaningful and relevant ways.

### **Implementation:**

Incorporating appropriate instruction and guidance to the students to do small projects in industry based /research based learning skills and content, thinking critically and solving problems in a group.

### **Outcome:**

Fosters critical thinking, problem-solving, and creativity, and promotes collaboration and communication skills.

## **4. Virtual Labs:**

### **Idea:**

Create immersive and interactive learning experiences that go beyond traditional classroom settings.

### **Implementation:**

During Covid or post-covid, engaging students in virtual field trips, simulations, and hands on learning, making complex concepts with more accessible.

### **Outcome:**

Improved students' conceptual understanding, laboratory or practical skills, and motivation and attitudes towards practical approach.

## **5. Use of Open Educational Resources:**

Open Educational Resources are freely available learning materials that can be accessed, shared, and

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adapted by teachers and students. They include textbooks, videos, simulations, and other digital resources that can enhance the quality and accessibility of education, and promote collaboration and innovation in the learning process.

**6. Industrial Visits:**

**Idea:**

To give exposure to the students about the practical environment with theoretical learning.

**Implementation:**

Industrial Visits are systematic and well planned or organised by the department for few subjects of program.

**Outcome:**

Students will get to know the working environment in the industries, their processing, how machines are working, interact with the experts.

**7. Hands on Training / Technical Events:**

**Idea:**

To engage students, develop skills, and apply knowledge to real-world situations.

**Implementation:**

Department / Students' Professional bodies or clubs are organizing technical events that are related to upgrading the knowledge of students. The department is planned systematically for the gradual growth of students.

**Outcome:**

- Flexibility and adaptability are increased
- Leverage essential learning skills and processes

**Strategies used to make the teaching more effective**

The college provides students and teachers with IEEE login and password access to the most recent quality papers in their area of emphasis for innovation and creativity teaching-learning.

Teachers are encouraged to take courses from the NPTEL and SWAYM platforms to broaden their knowledge in their areas of competence.

Teachers are encouraged to undertake research, attend workshops, seminars, and faculty development programs in order to achieve solid foundational knowledge and assist students by guiding them through projects.

Teachers are encouraged to join prestigious organizations such as IEEE, IETE, and others.

Teachers give continuous subjects to students in order to improve their knowledge and make them

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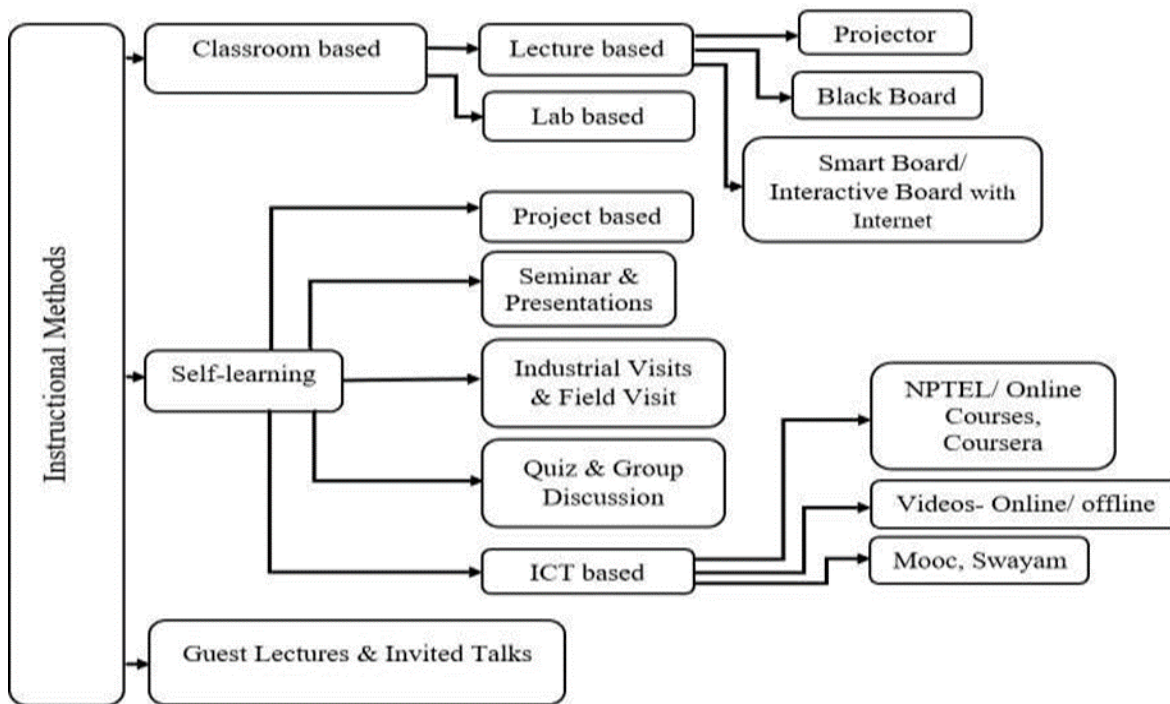
aware of current technologies. Students are encouraged to take part in various project contests such as the Smart India Hackathon.

Students are encouraged to present and publish papers at national and international conferences, which enriches and boosts their personality development and self-confidence.

Faculty are assigned to various course orientation process so that they are familiar with the revised syllabus, its content delivery, practical and theory evaluation methodologies, and so on.

Throughout the term, the faculty evaluates student performance and keeps track of it in the academic diary.

Faculty produces individual subject course time-plans in accordance with the college academic calendar, and they are regularly monitored during the term to ensure that the syllabus and content delivery are completed successfully. In addition to the prescribed syllabus, content beyond the syllabus is used to introduce students. Figure 2.6 shows different Strategies used to make the teaching more effective.



**Figure 2.6: Strategies used to make the teaching more effective**

## 5. Student Support and Engagement

### Methodologies for assisting weak students and encouraging bright students

#### Revised Mentoring System from June 2022

As stated in First Year Engineering, revised syllabus, University of Mumbai, Rev 2019, C scheme, circular No UG/65 of 2019-20, following revised protocols for student mentoring will be maintained with effect from current semester of academic year 2020-21.

Mentoring Guidelines (As per First Year Engineering, revised syllabus, University of Mumbai, Rev 2019, C scheme, circular No UG/65 of 2019-20):

Mentoring and connecting with students with faculty members is the most important part of student induction.

- Mentoring process shall be carried out in small groups, group of 10 students to be formed and allocated one senior student from 3<sup>rd</sup> year of the same program in which new students have taken admission, students mentor will continue for 2 years, till student mentor graduate from the institute.
- For two such group's one faculty mentor to be allocated from the same department or program who will remain the mentor till those students graduate from the institute.
- Groups for mentoring to be formed and student mentors and faculty mentors to be introduced to newly inducted students.
- Introduction of mentoring system to be given to the new students.
- Minimum one meeting to be conducted every month during semesters with student group by faculty mentors.
- For record keeping appropriate formats to be developed and information to be updated regularly by faculty mentors.

#### Need of Mentoring:

Mentoring is important as it provides professional socialization and personal support to facilitate academic success for undergraduate students. Mentoring guarantees students that there is someone who cares about them, assures them they are not alone in dealing with day-to-day challenges, and makes them feel like they matter. Mentoring connects a student to personal growth and development, and social and economic opportunity.

#### Concept:

Faculty Mentors are assigned for Second, Third and Final Year Students. Each mentor is for a group of 20-25 students. Mentor provides a support to the students to get adjusted with the college environment and guide them in achieving their Academic Goals.

#### Objectives of Mentoring:

The purpose of this System is to identify intervening mechanisms to improve the performance of weak students. In this context few objectives come across to achieve desired result.

- Addressing weaker students.
- Addressing students with learning disabilities.
- Addressing outstation students' problems.
- To focus and motivate students to achieve learning goals and thereby improve their

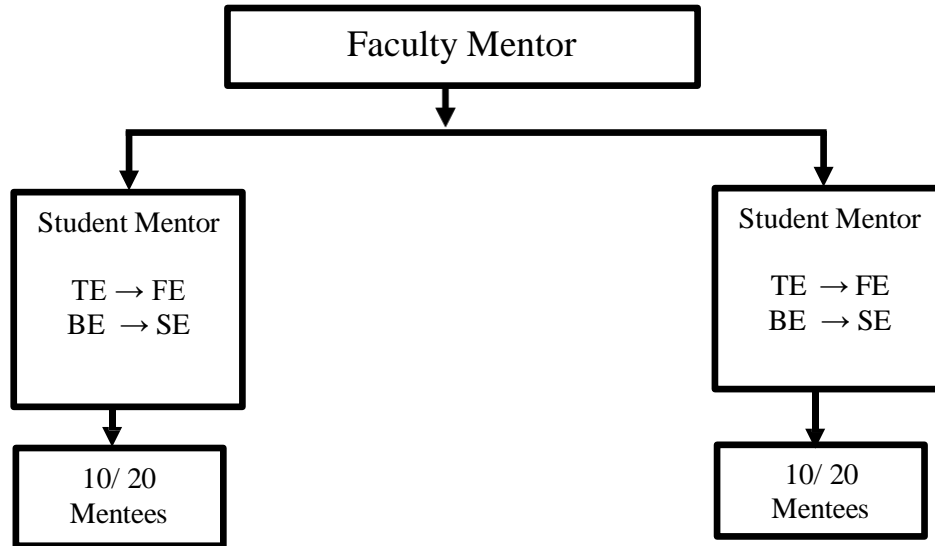


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academic performance.

- To generate interest in academics and other institutional activities amongst students.
- To strengthen their knowledge skills and attitudes in such subjects, where quantitative and qualitative techniques are involved so that the necessary guidance and training provided may enable the students to pursue higher studies efficiently.
- To prepare slower students for competitive exams.

**Mentoring System Mechanism:**



**Figure 2.7: The Mentoring System Mechanism Roles and Responsibilities:**

**Faculty Mentor:**

- Minimum one meeting to be conducted every month during semesters with students group by faculty mentors; however, students are free to meet him/her anytime formally and informally.
- To monitor the attendance regularly, record to be maintained for academic, co-curricular and extra-curricular activities.
- Counsel the mentee for any behavioral or psychological problem. Special Counseling is provided for academically weaker students and students with learning disabilities.
- Communicate with the mentee’s parents if needed.
- Provide guidance to mentee for internships, higher studies, scholarships, Career etc.

**Student Mentor:**

- Student mentor should attend monthly meetings with mentees scheduled by faculty mentors.
- Student mentor should fill the feedback of assigned mentees for each semester (from SEM-I to SEM-IV) in record maintained by the faculty mentor.

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- Extend help to mentee for internships, higher studies, scholarships, career, etc.
- Student mentor may help faculty mentor in one on one counseling to address issues faced or raised by assigned mentee.
- Figure 2.7 shows Mentoring system mechanism used for student performance improvement

**General Guidelines for Mentors:**

**Initiate:** Reach out to your mentee by sharing your background and experiences and asking open-ended questions. Encourage an active dialogue rather than offering a single solution to address your mentee’s concerns. Also, inform your mentee if you’re not sure about something.

**Communicate effectively:** Provide timely, honest, and thoughtful responses to your mentee whether it’s through email, phone, or in-person meetings. Give plenty of room for your mentee to speak or ask questions and foster a trusting environment.

**Be Patient:** Many students may not always respond as quickly or professionally as you are accustomed to. Be careful not to insist for information the mentee does not want to discuss.

**Time management:** Offer students ideas on how to manage their time better.

**Stay positive:** Do not be discouraged if your first or second mentee match doesn’t develop into a successful mentorship. There are many students waiting for your help.

**Mentorship:** If you are uncomfortable with anything being asked of you by a mentee you can decline the request and/or report the instance.

**Identification of weak & bright students**

| Category of learners | Method of categorizations                         |
|----------------------|---|
| Weak students        | IA-1 Marks < 50% and Previous semester CGPA < 6.0 |
| Bright students      | IA-1 Marks > 70% and Previous semester CGPA > 7.5 |

- Fig 2.8 shows Process to identify & monitor Weak & Bright Students

**Initiative to encourage bright student:**

- (a) The bright students are encouraged by giving the mentoring of other student (Slow learners).
- (b) The bright students are given extra assignments in both theory and laboratory.
- (c) They are encourage to opt honor courses, offer various positions in professional bodies and recommends for internship, permission to attend conferences, reimburse conference fees. Give Awards and certificates.
- (d) The bright students are encouraged to the competitive exams like GATE, GRE, TOFEL, GMAT and CIVIL Services by giving the suitable material and also special training.

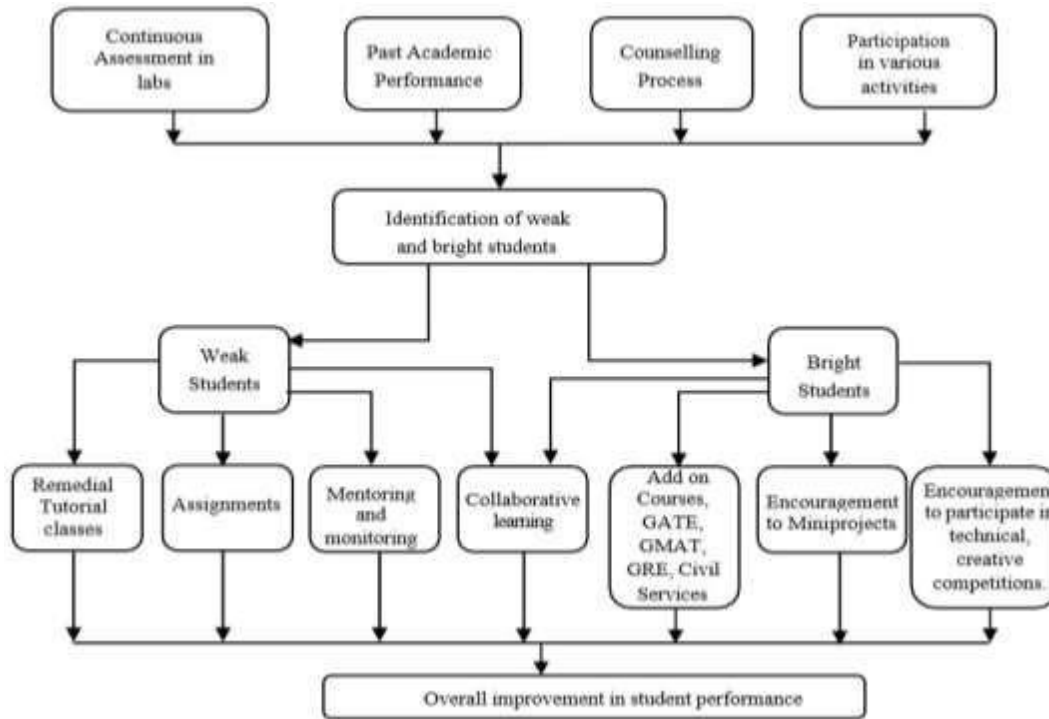
**Assisting Weak Students:**

- (a) They are supported by the student mentoring and faculty mentoring, extra classes, remedial Class are conducted.
- (b) Behavior problems are corrected through counselling system.
- (c) During the lab, special assistance given by faculty, Lab assistants and other bright students.

**Weak students:**

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The weak students are analyzed based on their performance analysis in mid-term exams, classroom interactions and participation in seminars and quiz.



**Figure 2.8: Process to identify & monitor Weak & Bright Students**

It's important to note that these criteria are general and can vary based on the specific requirements of course. The goal is to assess a student's holistic performance and development rather than placing them into rigid categories. Additionally, feedback and support mechanisms are crucial for all students to help them improve and excel in their academic journey.

**(iii) Action Taken**

Outcomes of action taken for weak students: Academic performance improves as a result of extra care/initiatives taken for weak students. Not only is their academic performance better as a result of the actions performed, but they are also hired by recruiters.

**(iv) Case Study of Bright student**

**Miss Sweta Kumari** of the 2019 batch was admitted in first year and mentored by first year faculty and department professors in second year. She was a highly regular and cooperative student who was well-known among her peers for her cooperation. She was recommended to become a class representative and a member of professional organizations. She became a dynamic student with excellent leadership characteristics since she was a highly sincere student who took guidance seriously. She not only obtained an internship at BSNL's Satellite Earth Station in Thane through a relative relation, but she also assisted in organizing and performing an industrial visit to the Satellite Earth Station. Her grades were great, and she participated enthusiastically in extracurricular, co-

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curricular, and social activities. Because of her high IQ and her internship at BSNL Satellite Earth Station. She was placed in three well-known companies.

## **6. Project based learning**

### **Procedure for B.E. Project Allocation, Monitoring, And Evaluation**

The standard procedure of final year projects from topic selection to submission of the project is very well defined and it is strictly followed to carry out the project work effectively. In this

1. A project coordinator is appointed by the Head of the department who is responsible for planning scheduling and execution of all the activities related to the student project work.
2. A project weekly report is made available to the students in appropriate format to keep the record of their regular project work like literature survey, work implementation, major issues, remarks, and next week's work plan from the respective guide/supervisor.
3. One week before the start of sem. VII a project coordinator display notice to submit two to three proposals for the final year project.
4. The project committee reviews proposals and approves any one proposal or identifies their area of interest.
5. Project guide/supervisor is allotted to respective project group as per their area of interest
6. The project guide/supervisor set a target for project group members to extensive literature study, design of the project, and revise the title of the project if required.
7. In the semester we conduct two reviews (First review and second review) i.e. in the 3<sup>rd</sup> and 11<sup>th</sup> week respectively to streamline their project work and further suggestions.
8. Pre-final exam presentation conducted in the 13<sup>th</sup> week of the semester, students are informed to prepare final project report and presentation on entire project work.
9. Term work marks are awarded to respective students based on their reviews, pre-final presentation, and regular interaction.
10. Respective guide/supervisor evaluates project work of a student in a group based on their regular involvement, skill, effort, knowledge.
11. Final oral/practical exam conducted at the end of the semester

**Project Schedule of semester-VII**

| <b>Week No</b> | <b>Task</b>   | <b>Particular</b>  |
|----------------|---|--|
| 1              | Project group formation and Submission of Project Proposals | Students are invited to form their project group and get it registered with the project coordinator of the department and inform them to prepare two to three project proposals.<br>Project proposals submitted by students are properly evaluated by a project committee and area-wise scrutinize.                      |
| 2              | Guide/supervisor allotment                                  | As per the area of interest, a guide/supervisor is allotted to the project group and instruct students to work as per instruction given by the respective guide/supervisor and note down work done every week in a printed Weekly Project Report booklet and show it to respective guide, project coordinator regularly. |
| 3 to 11        | Literature survey   | An extensive literature survey is done under the supervision of the respective guide and finds appropriate methodology, a technique used for implementation of the project.  |
| 4              | First Review  | The project committee monitors the work progress of the project and gives suggestions to streamline it.  |
| 11             | Second Review   | The project committee monitor work progress of the project and give suggestions for any modification and prepare report, presentation and also encourage students to write a paper.  |
| 13             | Internal presentation and final submission                  | Students are instructed to submit a project report in a Latex format and give a power point presentation on the project in front of the committee to approve their report and presentation.  |
| 14             | Final Exam  | Students are instructed to submit a complete project report in university format and give a PowerPoint presentation on the project in front of an external examiner.   |

**Procedure for Project Evaluation scheme for Sem. VII: Internal /external/ oral /TW marks of the project is based on the following evaluation sheet**

| <b>Particular</b>             | <b>Marks</b> |
|-------------------------------|--------------|
| Literature Survey/Innovations | 5            |
| Research and Design work      | 10           |
| Presentation                  | 5            |
| Knowledge and Applications    | 5            |
| <b>Total</b>                  | <b>25</b>    |

### Project Schedule of Semester-VII

| Week Number | Task   | Particular   |
|-------------|--|--|
| 1           | Weekly report allotment                            | Project In-charge share schedule of this semester, inform students to note down the record of their regular project work in a weekly report, and follow the instructions.  |
| 3           | First Review                                       | The project committee takes a review of work done to date this semester and instructs students for any change in design methodology to speed up their work.  |
| 3 to 11     | Implementation/<br>Testing<br><br>trouble shooting | Based on the extensive literature survey students start implementing the project, testing, trouble shooting, and finally design the proper cabinet of the model  |
| 11          | Second review                                      | Students are instructed to give a demonstration of a partially or fully ready project model and also power point presentation on the project in front of the committee.  |
| 13          | Internal presentation and final submission         | Students are instructed to submit a project report in university format and give a demonstration of a fully functional project model, also final power point presentation on the project in front of the committee and get the report certified, Submit a paper based on their project work. |
| 14          | Final Exam   | Students are instructed to submit a complete project report in university format and give a demonstration of a project model also a PowerPoint presentation on the same in front of an external examiner.  |

### Project Evaluation scheme for Sem.-VII:

**Parameters to analyze the quality of student projects and award of marks:** Ability of the students to demonstrate the overall idea & objectives.

- The ability of the students to demonstrate innovation, unique features, and use of the project in the real world.
- Student's ability to write & present the work effectively during the project presentations.
- The ability to use design methodologies to prepare a model/design of the overall project.
- Ability to apply the concepts of software engineering & project management concepts for designing, implementation, documentation, etc.
- Ability to present the results & outcomes appropriately.
  
- Ability to document the project as per the given instructions. His ability to write & represent the content

### Procedure for selection and Recommendation of Project for Financial Assistance

Finally, the Project committees recommend five projects as the best project of the year based on the novelty, quality, innovation, and society demand.

These projects are also recommended for financial assistance from our institute.

| Sr. NO. | Particular                        | Description  |
|---------|-----------------------------------|--|
| 01      | Innovations and Literature Survey | A new, fresh and original idea, strongly differentiated and unique, as well as a great solution to a current problem faced by the identified Market. Identifies target market, competitors, marketing strategies, and plans. Identifies sales strategies and plans, target market, and benefits of product How precise and relevant is the real-world problem? |
| 02      | Novelty                           | After an extensive literature survey for the project, students should come up with novelty in the project that includes the additional facility to customers which is not available with the old system that is more beneficial to the society.  |
| 03      | Objective and Scope               | Students are required to define the objectives of the project to achieve their aim systematically, effectively, and easily. The project should be designed in such a way that meets the need of society.   |
| 04      | Research & Design work            | How well the project has design offer it to layman which sustains in or all adverse condition. How well the model has a more compact design, consumes less supply, and works effectively.  |

The outcome of the Project:

- Knowledge of various aspects of project management was developed.
- Apply Engineering knowledge and identify, formulate and analyze engineering problems.
- The confidence level of the students was boosted.
- Improved teamwork spirit, ethics, and managerial skill.
- Implementation and deployment of the project for social benefits.
- Develop document preparation and presentation skill.
- Opportunities to showcase their project work in project exhibition
- Research publications

**Note:** Projects above are rated using the following scheme:

|          | Rating |
|----------|--------|
| High     | 3      |
| Moderate | 2      |
| Low      | 1      |

Few students also develop additional projects on college requirements, a collaborative project from some industry as a part of the in-house development cell in the guidance of faculty members.

Following are the guidelines related to your final year project research paper publication.

- **Paper Publication:**

All project groups are advised to present their project work in the reputed Journal/Conference in consultation with project guide.

**Some UGC Approved Journals**

- 1) International Journal of Innovative Research in Technology
- 2) International Journal of Artificial Intelligence and Soft Computing
- 3) Journal of Image Processing & Pattern Recognition Progress
- 4) Journal of Communication Engineering & Systems
- 5) Journal of Web Engineering & Technology
- 6) Trend in Electrical Engineering
- 7) Research & Reviews: A Journal of Embedded System & Applications
- 8) Journal of Semiconductor Devices and Circuits
- 9) Journal of Electronic Design Technology
- 10) Journal of Microelectronics and Solid State Devices
- 11) International Journal Of Electronics Engineering
- 12) Journal of Emerging Technologies and Innovative Research
- 13) Journal of Electrical and Electronics Engineering (JEE)
- 14) International Journal of Wireless and Mobile Computing (Inderscience)
- 15) Journal of Computer Networking, Wireless and Mobile Communications
- 16) International Journal of Sensors, Wireless Communications and Control
- 17) Journal of Wireless Communications and Mobile Computing (hindawi)
- 18) International Journal of Image Processing (IJIP)
- 19) IET Image Processing
- 20) International Journal of Image Mining
- 21) International Journal of Signal and Imaging Systems Engineering

- **Conferences**

IEEE, Springer, or any Scopus Index Conference or Journal

- **Project Report:**

Project Report must be in **LATEX** format and must be strictly as per the guidelines and template given by Project Coordinators on Students Class group.

- **Copyright:**

Filling Copy write registration is **mandatory** for all project groups.



**Instruction for Filing copyright registration form Online**

- 1) Enter your valid User ID and Password to login.
- 2) Click onto New User Registration, if you have not yet registered.
- 3) Note down User ID and Password for future use.
- 4) After login, click on to link “Click for online Copyright Registration”.
- 5) The online “Copyright Registration Form” is to be filled up in four steps
  - Step I. Complete the Form XIV, then press SAVE button to Save entered details, and press Step 2 to move to Next Step.
  - Step II. Signature to be scanned in 512 KB and kept ready for uploading.
  - Step III. Fill-up the Statement of Particulars, and then press SAVE button to Save entered details, and press Step 3/4 to move to Next step
  - Step IV. Fill-up the Statement of Further particulars. This form is applicable for “LITERARY/ DRAMATIC, MUSICAL, ARTISTIC AND SOFTWARE” works, and then press SAVE button to save entered details, and press Step 4 to move to Next Step.
  - Step V. Make the payment (**500 rupees**) through Internet Payment gateway
- 6) After successful submission of the form, Diary Number will be generated (Please note it for future reference).
- 7) File formats for submission.
  - a) Artistic Work to be uploaded in pdf/jpg format.
  - b) Sound Recording Work to be uploaded in mp3 format.
  - c) Literary/Dramatic, Music and Software Work to be uploaded in pdf format, less than 10 MB, keep ready.  
Pdf containing at least first 10 and last 10 pages of source code, or the entire source code if less than 20 pages, with no blocked out or redacted portions.
- 8) Please take 1 hard copy (print) of “Acknowledgement Slip” and 1 hard copy (print) of “Copyright Registration Form”, and send it by post to

Copyright Division

Department for Promotion of Industry and Internal  
Trade, Ministry of Commerce and Industry,  
Boudhik Sampada Bhawan, Plot No. 32,  
Sector 14, Dwarka, New Delhi-110078  
Email Address: copyright [at] nic [dot] in,  
Telephone No.: 011-28032496

**Plagiarism:**

All project reports and copyright poster must pass through **turnitin** plagiarisms check software.

**Participation in Paper presentation/Project Competition**

All project groups are instructed to participate in Paper presentation (ICRUS) or Project competition (TECHNOVISION, IEEE Bombay section project competition hoisted by MCT's Rajiv Gandhi Institute of Technology)an in our college or other colleges/Universities.

SOP /Checklist for Project report submission

| Sr. No. | Head  | Remark |
|---------|---|--------|
| 1)      | Paper Publication   |        |
| 2)      | Turnitin Originality Report (should not exceed 30% excluding references)  |        |
| 3)      | Online Copyright Registration (shown payment slip)  |        |
| 4)      | Draft report in LATEX format before black book printing (at least 50 pages report excluding plagiarism report, codes, data sheets, publication) |        |
| 5)      | Final Report in LATEX Format  |        |
| 6)      | Participation in Project Competition  |        |

Please find here with the list of documents to be submitted by respective project supervisor to project coordinator **before date ( ----- )**.

- 1) Published or submitted paper
- 2) Originality report
- 3) A3 size copyright poster along with payment slip
- 4) Project completion certificate

**Mini Project Process and Evaluation Procedure**

**Background:**

- We encourage students to search the topic for their SEM III/SEM V project such that it can be further extended in SEM IV/SEM VI Mini Project.
- Counseling of students is done regularly SEM III & V and SEM IV & VI mini project lab session by Mini Project Coordinator.

**Initiatives**

- The student's projects are selected in line with the department's mission, vision, POs, and PSOs.
- Students are provided with a brief idea of various fields for selecting the project ideas like problem statements of various department governments of India and others.
- The faculties encourage the students to carry out projects which address problems based on societal /research needs.
- Students are also encouraged to avail themselves of the internal/external funding schemes for their project work. (Like Institute, UGC project funding scheme, KVIC, etc.)

**Procedure:**

The standard procedure of Second-year project from topic selection to submission of the project is very well defined and it is strictly followed to carry out the project work effectively. In this

- A project coordinator is appointed by the Head of the department who is responsible for

**Department of Electronics and Telecommunication Engineering**

planning, scheduling, and execution of all the activities related to the student project work.

- A project of each group is continuously monitored by the Mini Project co-coordinator/supervisor
- In the semester two reviews are conducted (First review and Second review) i.e. in the 3<sup>rd</sup> and 12<sup>th</sup> week respectively to streamline their project work and further suggestions.
- Term work marks are given to a respective student based on their review performance.
- Respective supervisor in review evaluates project work of a student in a group based on their regular involvement, skill, effort, knowledge.
- Final oral/practical exam conducted at the end of the semester.

**Mini Project Schedule:**

**For SE and TE students**

| Week Number | Task  | Particular  |
|-------------|---|---|
| 1           | Project group formation and Submission of Project Proposals | <ul style="list-style-type: none"> <li>• Students are invited to form their project groups.</li> <li>• Project proposals submitted by students are properly evaluated by a Mini Project Co-ordinator</li> </ul> |
| 2           | Project title finalization                                  | As per the area of interest, the Mini Project coordinator instructs students to work on the project.  |
| 3           | First Review  | The project committee monitors the project and gives suggestions to streamline it.  |
| 4 & 5       | Simulation Demonstration for Arduino Project                | Students are instructed to demonstrate the simulation of their project based on Arduino   |
| 6 & 7       | Simulation Demonstration for Raspberry Pi Project           | Students are instructed to demonstrate the simulation of their project based on Raspberry Pi  |
| 8 & 9       | Project Synopsis Submission for Arduino Project             | Students are instructed to submit complete project reports in university format and give a PowerPoint presentation of the project based on Arduino  |
| 10 & 11     | Project Synopsis Submission for Raspberry Pi Project        | Students are instructed to submit a complete project report in university format and give a PowerPoint presentation of the project based on Raspberry Pi  |

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|    |               |   |
|----|---------------|---|
| 12 | Second Review | The project committee monitor work progress of the project and give suggestions for any modification and prepare report, presentation and also encourage students to write a paper. |
| 13 | Final Exam    |   |

**project Evaluation scheme:**

Internal/external oral/TW marks of the project are based on regular work.

| Particular  | Marks |
|---|-------|
| Marks awarded by guide/supervisor based on Mini Project lab Session(Review) | 10    |
| Identification of Problem   | 3     |
| Proposed final solution   | 3     |
| Procurement of components/systems   | 2     |
| Building prototype and testing  | 2     |
| Quality of Project report   | 5     |
| Total   | 25    |

**Mini project Areas**

| Sr.No | Engineering Year | Domain                       |
|-------|------------------|------------------------------|
| 1     | Second Year      | Analog and digital circuits  |
|       |                  | Control and automation       |
|       |                  | Digital design               |
| 2     | Third Year       | Embedded and microcontroller |
|       |                  | Wireless and IOT             |
|       |                  | Image and video processing   |

## **7. Industry Internship and Training**

### **Training and Placement Cell**

The Training and Placement cell ensures the future of the students in the dynamic & vibrant professional job market. This cell ensures that the efforts of the students throughout the course bear fruits at the end. The training and placement cell is headed by Training and Placement Officer.

The TPO runs all the training and placement activities with the help of different committees constituted for attracting the pool of job opportunities for our students. There are more than fifty companies recruiting the students. The training and Placement Cell organizes expert talks and training programmes for developing the students' Soft Skills and employability skills.

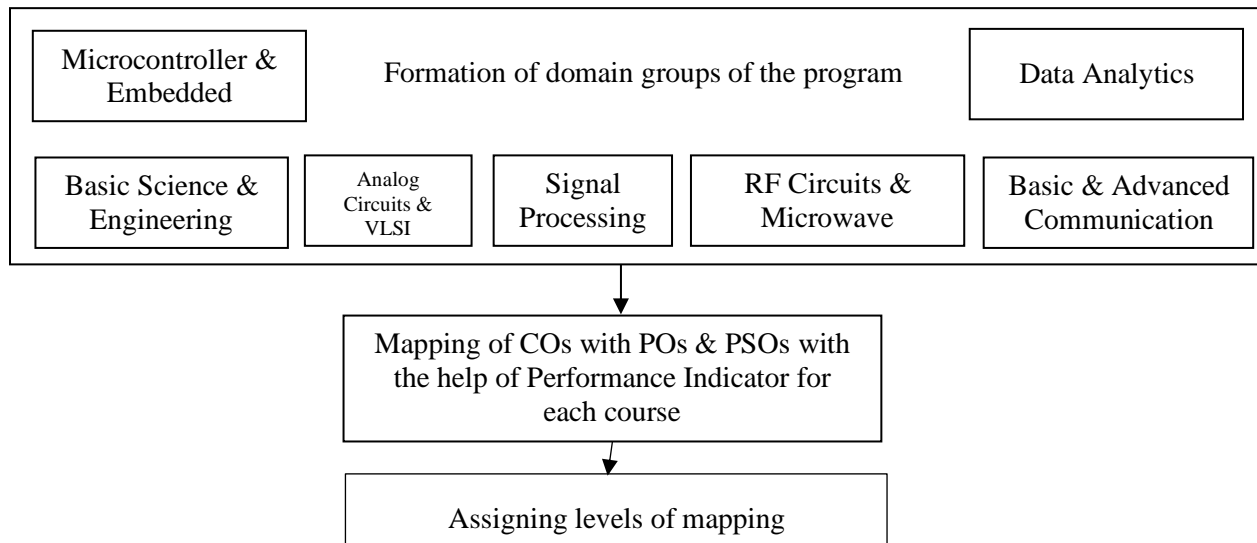
### **Training Activities**

- Conduction of soft skill Training Program for T.E. and B.E. students. This include communication skill, Group Discussion & Interview preparation.  
Conduction of Aptitude Test for English, Logical Reasoning, Quantitative Analysis etc. through assignments & practice test papers.
- Arranging the expert talks on spiritual, personality development, etc.
- A Conduction of online test for students to assess their aptitude & technical skills.
- Arranging seminar & counseling of students about careers & future education.
- Organizing Yoga camps for students.

In addition, these practices are highly encouraged to make learning more student- centric. Performance in these activities gives an excellent opportunity to students to improve upon their knowledge level. Technical fests, contests, debates, etc. are arranged and organized mostly by the students themselves so that student-centered learning exercises are developed both at the department and institute level. This improves the qualities such as leadership, decision making, self-learning from experience.

## 8. Correlation between Courses and Pos/PSOs

### Procedure of Calculating CO PO Attainment



**Figure 1: Formation of Articulation Matrix with PO and PSOs**

Step 1: Formation of Domain Group / Mapping, Validation and Formation of Rubrics of CO PO PSO as per syllabus content / Creation of Articulation Matrix / Justification remarks for CO PO PSO attainment level

ARTICULATION MATRIX FOR CO PO MAPPING FOR COURSE:

| Articulation Matrix |      |      |      |      |      |     |     |     |     |      |      |      |      |      |
|---------------------|------|------|------|------|------|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO               | PO1  | PO2  | PO3  | PO4  | PO5  | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1                 | 2    | --   | --   | --   | 3    | --  | --  | --  | --  | --   | --   | --   | 3    | 2    |
| CO2                 | 1    | --   | --   | --   | --   | --  | --  | --  | --  | --   | --   | --   | --   | --   |
| CO3                 | 3    | 3    | --   | --   | 3    | --  | --  | --  | --  | --   | --   | --   | --   | --   |
| CO4                 | 1    | 3    | 1    | 3    | 3    | --  | --  | --  | --  | --   | --   | --   | --   | --   |
| CO5                 | --   | 3    | 2    | 3    | 3    | --  | --  | --  | --  | --   | --   | --   | --   | --   |
| CO6                 | 1    | --   | 2    | 3    | 3    | --  | --  | --  | --  | --   | --   | --   | --   | --   |
| Average             | 1.60 | 3.00 | 1.67 | 3.00 | 3.00 | --  | --  | --  | --  | --   | --   | --   | 3.00 | 2.00 |

**ARTICULATION MATRIX FOR SUBJECT / COURSE** (Assigning weightages as percurriculum)

High – 3

Moderate – 2

Low – 1

**9. Course Outcome Assessment**

Assessment processes used to gather the data upon which the evaluation of Course Outcome is based

**A standard practice followed in the Department for POs attainment**

The process of finding the attainment of POs is well documented and exists as a standard template. It is established in a structured way. The document details process of CO to PO mapping. Various direct and indirect tools used to find attainment of POs have been clearly stated in the document. The stages followed to find attainment of POs are carefully drafted. The Department follows a regular practice of conducting an annual academic audit by external experts to audit the documentation of attainment of program. The documentation is further endorsed by RGIT's IQAC cell.

**ASSESSMENT PROCESS FOR DATA COLLECTION**

- At the initial stage, the Course Outcomes (CO's) for each course are defined based on the Program Outcome (PO's) along with its Performance Indicator. At the end of each course, the COs need to be assessed and evaluated, to check whether it has been attained or not.
- Assessment is one or more processes, carried out by the department, that identify, collect, and prepare data to evaluate the achievement of program educational objectives 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 or examination result.
- Attainment of the COs can be measured directly and indirectly.
- Direct attainment basically displays the student's knowledge and skills from their performance. It can be determined from the performance of the students in all the relevant assessment instruments – like internal assessments, assignments, lab experiments and final university examination. These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.
- Indirect methods such as surveys and interviews ask the stakeholders to reflect on student's learning. They assess opinions or thoughts about the graduate's knowledge or skills.
- Indirect measures can provide information about graduate's perception of their learning and how this learning is valued by different stakeholders.

**Department of Electronics and Telecommunication Engineering**  
**Description**

| Sr.No. | Direct Assessment              | Description   |
|--------|--------------------------------|---|
| 1.     | Internal Assessment (IA) tests | Department will conduct two internal tests, scheduled in accordance with the university and college calendar of events.   |
|        |                                | The faculties will prepare the Question papers for the respective subject and will be submitted to Internal Test coordinator well in advance.   |
|        |                                | The faculties will follow scheme and solutions for each test and evaluate the performance of students. The Internal assessment marks are based on average score of two tests conducted. |
| 2.     | Lab Assessment                 | Laboratory in-charge faculties will follow the rubrics, which is set by the department for evaluation of laboratory experiments/programs.   |
|        |                                | There shall be maximum of 10 Marks in each.   |
| 3.     | Assignment                     | Based on the subject two assignments are given each of 10 Marks. The assignment marks are based on average of two assignment.   |
| 4.     | End Semester examination marks | There shall be maximum of 80 Marks and minimum of 32 marks to pass the university examination.  |
| Sr.No. | Indirect Assessment            | Description   |
| 1      | Program Exit Survey            | Class Advisor collects the program exit survey for indirect assessment after completion of program.   |
| 2      | Alumni Feedback                | Alumni of the college provides feedback for the improvement in the overall process.   |
| 3      | Parents Feedback               | Parents provide feedback on every parent teacher meet.  |
| 4      | Employer Feedback              | Employer provides feedback based on the eligibility of students in placement activities.  |
| 5      | Professional Body(IETE / IEEE) | Students Professional Bodies conduct various technical activities like Seminar, Workshops, Expert Talks etc. For every activity feedback is collected and used for indirect assessment. |



## 10. PO and PSO Assessment

Attainment of PO through Course Outcomes

| CO/<br>PO | PO1 | PO2  | PO3  | PO4  | PO5  | PO6  | PO7  | PO8  | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|-----------|-----|------|------|------|------|------|------|------|-----|------|------|------|------|------|
| CO1       | 3   | 2    | 1    | 2    | --   | --   | --   | --   | --  | --   |      | 2    |      |      |
| CO2       | 2   | 2    | 2    | 3    | 1    | --   | --   | --   | --  | --   | 2    | 2    |      |      |
| CO3       | 2   | 3    | 3    | 3    | 2    | 2    | 1    | 2    | --  | --   | 2    | 2    |      |      |
| CO4       | 2   | 2    | 1    | 2    | 2    | --   | 1    | --   | --  | --   | 1    | 1    |      |      |
| CO5       | 1   | 1    | 1    | 1    | --   | --   | --   | --   | --  | --   | 2    | 2    |      |      |
| CO6       | 2   | 3    | 3    | 3    | 3    | 2    | 2    | 1    | --  | --   | 2    | 2    |      |      |
| AVG       | 2   | 2.17 | 1.83 | 2.33 | 2.00 | 2.00 | 1.33 | 1.50 | -   | -    | 1.80 | 1.83 |      |      |

- Calculate the Average Value of PO through Course Outcomes

$$\text{Average Value PO} = \frac{\text{Total of attainment level}}{\text{Total No. of COs mapped with PO}}$$

- Attainment level is measured in terms of student performance in Internal Assessment (IA) with respect to the Course Outcomes of the course in addition to the performance in the End Semester Examination (ESE).
- The final attainment of each CO is measured by taking 20% of IA attainment levels and 80% of ESE attainment levels.
- As per the regulation R-2019, the normalization percentage will be considered for measuring the final attainment of each COs of a course. For theory courses 20% of IA and 80% of ESE will be calculated. For Laboratory courses 20% of CA and 80% of ESE will be calculated.
- The CO attainment for the course will be calculated by taking the average of all CO's final attainment value. If the Final Attainment of the Course outcomes are equal to the target, then all the course outcomes are attained else not attained.
- If a course failed to attain the set attainment target, then action to be taken for continuous improvement will be suggested by the course handling faculty.

  
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**RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI**  
 Permanently Affiliated to University of Mumbai)  
**Department of Electronics and Telecommunication Engineering**  
**Program Outcome Articulation Matrix**

(After entering the Average values of Course Outcomes of all subjects of a Program)

| Year         | Sem. | Subject Code | Name of Subject       | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1 | PS O2 |
|--------------|------|--------------|-----------------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| FE           | I    | FEC101       |                       |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|              | II   | FEC201       |                       |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
| SE           | III  | ECC301       |                       |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|              | IV   | ECC401       |                       |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
| TE           | V    | ECC501       | Digital Communication | 2    | 2.17 | 1.83 | 2.33 | 2.00 | 2.00 | 1.33 | 1.50 | -    | -     | 1.80  | 1.83  |       |       |
|              | VI   | ECC601       |                       |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
| BE           | VII  | ECC701       |                       |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|              | VIII | ECC801       |                       |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
| Target Value |      |              |                       |      |      |      |      |      |      |      |      |      |       |       |       |       |       |

Calculate Average Value of PO of all subjects

$$\text{Average Value PO} = \frac{\text{Total of attainment level}}{\text{Total No. of subjects mapped with PO}}$$

**PO & PSO Assessment and Attainment:**

PO assessment tools are categorized into Direct method and Indirect method. The final PO attainment is calculated by taking 80% of the attainment values from Direct assessment method and 20% of the attainment values from Indirect assessment method.

**Direct Method:**

- Once the overall attainment percentage of each COs is calculated, the PO and PSO attainment is calculated by taking the cumulative average of all the course's CO attainment which contributes to the Program Outcomes and Program Specific Outcomes.

- The overall CO attainment values are calculated for all the direct assessment tools. For

**Department of Electronics and Telecommunication Engineering**

theory and practical courses, for R2019, Overall CO attainment is calculated using the following  
 Overall attainment of COs (Theory) = 0.2\*IA attainment + 0.8\*ESE attainment Overall  
 attainment of COs(Practical& Project) = 0.2\*CA attainment + 0.8\*ESE attainment

**Step 2: Calculation for Direct Attainment for CO-PO Mapping**

**1. Direct Tools:**

- Internal Assessment I & II
- Assignments
- Tutorials
- Experiments
- Subject / Course Project
- Industrial Visits
- Presentation
- Final University Examination (Subject / Oral /Practical)

Note: High Scoring subjects can elevate the attainment level with justification  
 (If the results are observed consistently high, No failures or Number of failures  
 are less, any other) for a particular course.

Enter the data of each student:

| Name of students                             | IA 1 |    | IA2 |    | Assignment |    | Course<br>Project / IV<br>/ Presentation | University<br>Exam |
|--|------|----|-----|----|------------|----|--|--------------------|
|  | Q1   | Q2 | Q1  | Q2 | A1         | A2 |  |                    |
| <b>Max Marks</b>                             |      |    |     |    |            |    |  |                    |
| Student 1                                    |      |    |     |    |            |    |  |                    |
| Student 2                                    |      |    |     |    |            |    |  |                    |
| Student 3                                    |      |    |     |    |            |    |  |                    |
| .  |      |    |     |    |            |    |  |                    |
| .  |      |    |     |    |            |    |  |                    |
| Student 100                                  |      |    |     |    |            |    |  |                    |
| Total No. of<br>students appeared            |      |    |     |    |            |    |  |                    |
| Total No. of<br>students scored above 60     |      |    |     |    |            |    |  |                    |
| Total No. of students scored<br>=>50 and <59 |      |    |     |    |            |    |  |                    |
| Total No. of students scored<br>=>40 and <49 |      |    |     |    |            |    |  |                    |
| <b>Mapping CO</b>                            |      |    |     |    |            |    |  | <b>All COs</b>     |
| <b>Attainment Level</b>                      |      |    |     |    |            |    |  |                    |

**Calculation of Attainment Level Example:**

If Total no of students are 100

Total No. of students scored above 60 = 50

Total No. of students scored above 50 and

<59 = 25 Total No. of students scored

above 40 and <49 = 25

Then Attainment Level =  $(50 \times 3 + 25 \times 2 + 25 \times 1) / 100 = 2.25$

External Assessment 80% and Internal Assessment 20% Calculation

| Course Outcome | Internal Assessment (20%) |            |            |                             | External Assessment (80%) | 80% of External+20% of internal examination |
|----------------|---------------------------|------------|------------|-----------------------------|---------------------------|---|
|                | IA-I OR IA-II             | Experiment | Assignment | Internal Evaluation Average | University Evaluation     |   |
| CO1            | 2.87                      | 2.87       | 2.66       | 2.8                         | 1.7                       | 1.92  |
| CO2            | 2.92                      | 2.81       | 2.66       | 2.8                         | 1.7                       | 1.92  |
| CO3            | 2.66                      |            | 2.66       | 2.66                        | 1.7                       | 1.89  |
| CO4            | 2.82                      |            | 2.66       | 2.74                        | 1.7                       | 1.91  |
| CO5            |                           |            | 2.66       | 2.66                        | 1.7                       | 1.89  |
| CO6            |                           |            | 2.66       | 2.66                        | 1.7                       | 1.89  |

**Articulation Matrix: (Converting Levels to Scores)**

- Level 3 = Actual score
- Level 2 = Actual Score x 2 / 3
- Level 1 = Actual Score x 1 / 3

| Actual Score | CO PO Attainment as per weightage |      |      |
|--------------|-----------------------------------|------|------|
|              | 3                                 | 2    | 1    |
| 1.89         | 1.89                              | 1.26 | 0.42 |
| 1.87         | 1.87                              | 1.24 | 0.41 |
| 1.79         | 1.79                              | 1.20 | 0.40 |
| 1.79         | 1.79                              | 1.19 | 0.40 |
| 1.92         | 1.92                              | 1.28 | 0.43 |
| 1.93         | 1.93                              | 1.29 | 0.43 |

**Direct Attainment of Course Outcomes with PO:**

(Articulation Matrix gets converted to Score Based Matrix)

| CO / PO | PO1        | PO2         | PO3         | PO4         | PO5         | PO6         | PO7         | PO8         | PO9 | PO10 | PO11        | PO12        | PSO1 | PSO2 |
|---------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----|------|-------------|-------------|------|------|
| CO1     | 1.89       | 1.26        | 0.42        | 1.26        | --          | --          | --          | --          | --  | --   |             | 1.26        |      |      |
| CO2     | 1.24       | 1.24        | 1.24        | 1.87        | 0.41        | --          | --          | --          | --  | --   | 1.24        | 1.24        |      |      |
| CO3     | 1.2        | 1.79        | 1.79        | 1.79        | 1.2         | 1.2         | 0.4         | 1.2         | --  | --   | 1.2         | 1.2         |      |      |
| CO4     | 1.19       | 1.19        | 0.4         | 1.19        | 1.19        | --          | 0.4         | --          | --  | --   | 0.4         | 0.4         |      |      |
| CO5     | 0.4        | 0.43        | 0.43        | 0.43        | --          | --          | --          | --          | --  | --   | 1.28        | 1.28        |      |      |
| CO6     | 1.28       | 1.93        | 1.93        | 1.93        | 1.93        | 1.29        | 1.29        | 0.43        | --  | --   | 1.29        | 1.29        |      |      |
| AVG     | <b>1.2</b> | <b>1.31</b> | <b>1.04</b> | <b>1.41</b> | <b>1.18</b> | <b>1.25</b> | <b>0.70</b> | <b>0.82</b> | -   | -    | <b>1.08</b> | <b>1.11</b> |      |      |

**Direct Attainment of Program Outcomes:**

(Considering all Subjects)

| Year               | Sem. | Name of Subject | PO1 | PO2  | PO3  | PO4  | PO5  | PO6  | PO7  | PO8  | PO9 | P10 | P11  | P12  | PSO1 | PSO2 |
|--------------------|------|-----------------|-----|------|------|------|------|------|------|------|-----|-----|------|------|------|------|
| FE                 | I    | FEC101          |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    |      | FEC102          |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    | II   | FEC201          |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    |      | FEC202          |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
| SE                 | III  | ECC 301         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    |      | ECC 302         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    | IV   | ECC 401         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    |      | ECC 402         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
| TE                 | V    | ECC 501         | 1.2 | 1.31 | 1.04 | 1.41 | 1.18 | 1.25 | 0.70 | 0.82 | -   | -   | 1.08 | 1.11 |      |      |
|                    |      | ECC 502         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    | VI   | ECC 601         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    |      | ECC 602         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
| BE                 | VII  | ECC 701         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    |      | ECC 702         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    | VIII | ECC 801         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
|                    |      | ECC 802         |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
| <b>Average</b>     |      |                 |     |      |      |      |      |      |      |      |     |     |      |      |      |      |
| <b>Direct 80 %</b> |      |                 |     |      |      |      |      |      |      |      |     |     |      |      |      |      |

For Calculation of Direct attainment level of PO =

$$\frac{\text{Total of attainment Level}}{\text{No of courses for that particular PO}}$$

**Indirect Method:**

Survey reports gathers information about student learning by looking at indicators of learning other than student work output. This assessment approach is intended to find out about the quality of the learning process by getting feedback from the student, employers, and exit surveys of graduates.

**2. Indirect Attainment Tools:**

- Program Exit Survey
- Employer Feedback: Rubrics is given in department
- Alumni Feedback: Rubrics is available in Academic Diary
- Parents Feedback: Rubrics is available in Academic Diary
- Feedback from Industry

Rubrics of Indirect Attainment for all types of Feedback and Survey

| Name of Alumni | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO 11 | PO 12 | PSO1 | PSO2 |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-------|-------|------|------|
| Student 1      | 1   |     | 1   |     | 1   |     | 1   |     |     | 1    |       | 1     |      |      |
| Student 2      | 2   | 1   | 2   |     | 2   |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 3      | 2   | 1   | 2   |     | 1   |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 4      | 2   | 2   | 1   |     |     |     | 1   |     |     | 1    |       | 1     |      |      |
| Student 5      | 3   |     |     |     |     |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 6      | 2   |     | 2   |     |     |     |     |     |     | 2    |       | 2     |      |      |
| Student 7      |     |     |     |     |     |     |     |     |     |      |       |       |      |      |
| Student 8      | 2   | 1   | 2   |     | 1   |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 9      | 2   | 2   | 1   |     |     |     | 1   |     |     | 1    |       | 1     |      |      |
| Student 10     | 3   |     |     |     |     |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 11     | 2   |     | 2   |     |     |     |     |     |     | 2    |       | 2     |      |      |
| Student 12     | 2   | 1   | 2   |     | 1   |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 13     | 2   | 2   | 1   |     |     |     | 1   |     |     | 1    |       | 1     |      |      |
| Student 14     | 3   |     |     |     |     |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 15     | 2   |     | 2   |     |     |     |     |     |     | 2    |       | 2     |      |      |
| Student 16     | 2   | 1   | 2   |     | 1   |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 17     | 2   | 2   | 1   |     |     |     | 1   |     |     | 1    |       | 1     |      |      |
| Student 18     | 3   |     |     |     |     |     | 2   |     |     | 2    |       | 2     |      |      |
| Student 19     | 2   |     | 2   |     |     |     |     |     |     | 2    |       | 2     |      |      |
| Student 20     | 2   | 2   | 1   |     |     |     | 1   |     |     | 1    |       | 1     |      |      |
| <b>Average</b> | 2.2 | 1.5 | 1.6 | 0.0 | 1.2 | 0.0 | 1.6 | 0.0 | 0.0 | 1.7  | 0.0   | 1.7   |      |      |

**Rubrics for Indirect Attainment:**

| Tools                      | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| Program Exit Survey        |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
| Employer Feedback          |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
| Alumni Feedback            |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
| Parents Feedback           |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
| Feedback from Industry     |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
| Average                    |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
| 20% of Indirect Attainment |     |     |     |     |     |     |     |     |     |      |      |      |      |      |


**Indirect Attainment of Program Outcomes**

For Calculation of Indirect attainment level of PO =

Total of attainment Level

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No of Feedbacks for that particular PO

  
 MANJARA CHARITABLE TRUST  
**RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI**  
 Permanently Affiliated to University of Mumbai)  
**Department of Electronics and Telecommunication Engineering**

**Overall Attainment of Program Outcomes:**

0.8 x Attainment Level of PO as per Direct + 0.2 x Attainment Level of PO as per Indirect

| Program Outcomes    | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| Direct Attainment   |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
| Indirect Attainment |     |     |     |     |     |     |     |     |     |      |      |      |      |      |
| Overall attainment  |     |     |     |     |     |     |     |     |     |      |      |      |      |      |