THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

- **Feedback from Graduating Students**

- **Feedback from Alumni**

- **Feedback from Employer**

- **Feedback from faculty**

- **Analysis of feedbacks received and action taken report**

Process of Program outcome attainment:

The Program Outcomes (PO) or the Program Specific Outcomes (PSO) are achieved through curriculum that offers a number of mandatory courses as well as elective courses. Each course in the curriculum has defined course outcomes that are mapped to the program outcomes and a set of performance criteria that are used to provide quantitative measurement of how well course outcomes are achieved. The process of PO or PSO attainment level is shown by the following flowchart:
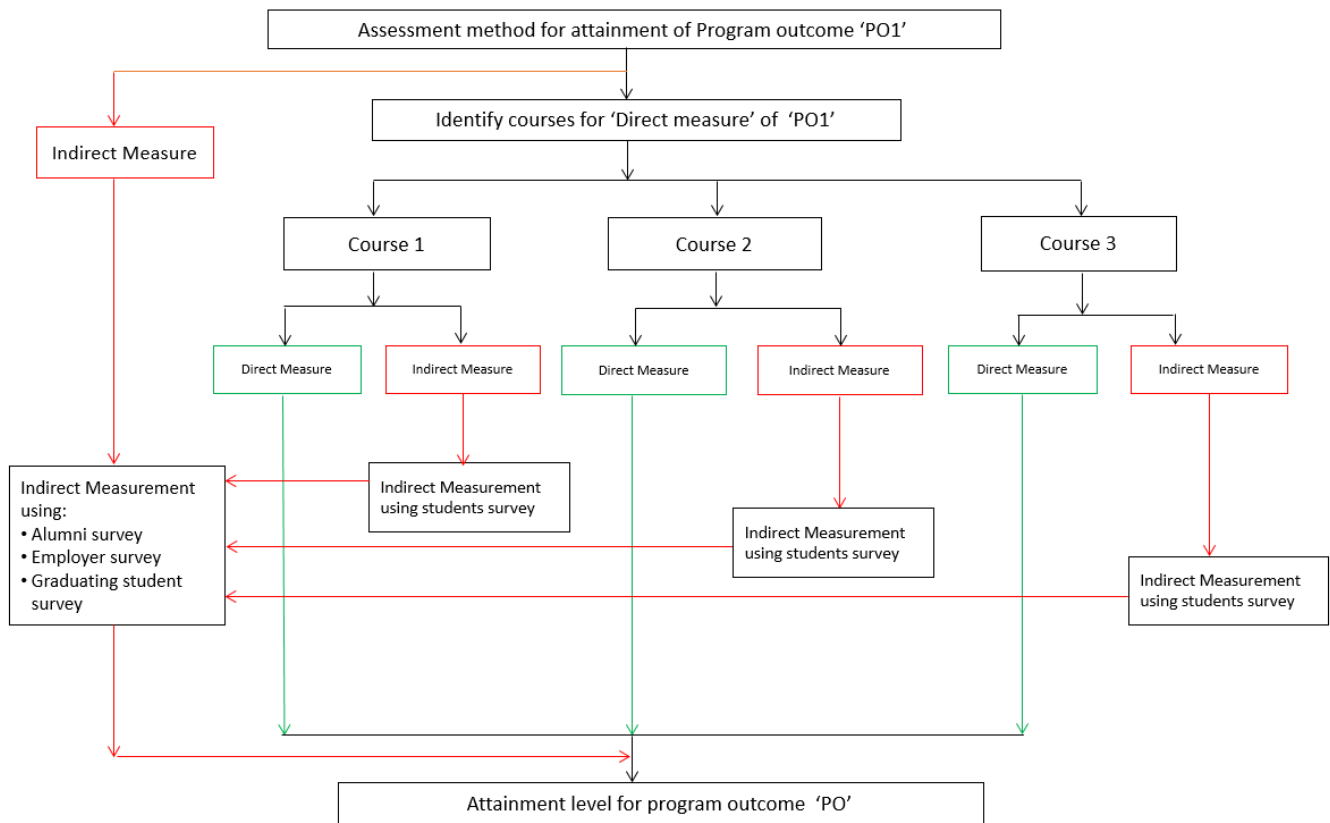

Figure 1. Flowchart showing the process of PO/PSO attainment level.

As shown in the flowchart given above, each of the PO or the PSO are assessed using a direct and an indirect method.

This assessment is carried out using the following measurable and quantitative parameters and survey/questionnaire techniques/tools.

A. **Assessment Tools used for measurement of Program Outcome attainment:**

In the Outcome Based Education (OBE), the course outcome attainment scores measured using direct and indirect assessment tools is eventually used for measuring the attainment of Program Outcomes and Program specific outcomes. Thus, PO and PSO assessment process uses both direct and indirect measures to measure the attainment of each outcome. The examples of such measures are given below:

1. Direct Assessment tools:

After evaluating the attainment of course outcomes using direct assessment tools (as mentioned in Table 2, average direct CO score for each course is computed. Direct assessment score for attainment of PO and PSO is computed by mapping the direct CO scores for all courses with corresponding PO's as defined in the program articulation matrix. Following direct assessment tools are employed for measuring PO/PSO attainment:

- Mid Semester Examinations   [Once during 8th or 9th week of a semester]
- End semester Examination   [Once during 15th week of the semester]
- Tutorial Assignments   [Varies depending on the tutorial engagement]
- Quizzes   [Mostly once during semester, Varies and is decided by course coordinator]
- Projects   [Mostly once during semester, Varies and is decided by course coordinator]

2. Indirect Assessment tools:

This includes feedbacks from all the stakeholders such as course exit survey, Graduating student survey, Alumni feedback, Employer feedback etc.

S. No.	Indirect Assessment Tool	Method Description
	Table: **Indirect Assessment Tools**	
1	Course Survey [Twice before MST and EST]	Course Survey is completed for every course in each semester to get a formal feedback from students for the courses offered in a semester and provide objective information to the faculty for self-appraisal, self-improvement & development. The course survey is focussed on attainment of course outcomes. Formal student feedback is obtained online and it is mandatory for all students to participate in such surveys. The course survey results are compiled by the individual course instructors for his feedback.
2	Graduating student's survey [Once per year for the	A questionnaire survey is used to measure the level of achievement of expected program outcomes/program specific outcomes. It is mandatory for all graduating students to participate in this questionnaire. Each participant is asked to rate his/her perception of achievement of the program outcomes/program specific outcome on a scale of 1 to 5 where

	graduating batch]	1 signifies a poor outcome and 5 signifies a high level of achievement of objectives. The indirect CO scores measured through this tool are mapped to Likert scale of 1 to 3. The assessment results are documented and discussed in the meeting of department faculty to make action points for initiating corrective and preventive actions. A sample filled copy of graduating students' survey form is provided in Annexure-I.
3	Alumni survey [Once in three years]	It is believed that the perception of students changes from the time of graduation to some point in their respective careers as they get more mature and have learnt tricks of the trade on the job. At this point of time, they are in a better position to provide more valuable and objective feedback on the learning in their undergraduate program and also how much of the program outcomes (on some scale) have actually been possible. To obtain this information, a survey is conducted for practicing alumni who graduated during the last 2 to 5 years. This survey like the graduating student survey is targeted at the program outcomes & program specific outcomes achieved during the last 2 to 5 years. Again, the respondents are asked to rate each PO and PSO on a scale of 1 to 5. The indirect CO scores measured through this tool are mapped to Likert scale of 1 to 3. The findings of the survey are processed and used for effecting improvements in the program to achieve the program educational objectives and program outcomes.
4	Employer survey [Once in three years]	All the students of program to be accredited are required to spend a full six month's semester in the industry completing an industrial project under the joint supervision of industry supervisors and TIET faculty. All the faculty members are required to visit one or two organizations two times during their six month's semester in the industry for evaluation of students placed for their work term in these organizations. This provides an opportunity to take feedback of our graduated students working in these organizations. During the course of interaction with the employer of our students, the employers provide information on their performance against POs & PSOs through survey form. This form, like the other forms, has questions related to the POs & PSOs. The rating is again given on a scale of 1 to 5 with 5 representing the best performance. The

| | | indirect CO scores measured through this tool are mapped to Likert scale of 1 to 3.A sample copy of filled employer survey form is provided in Annexure-I. |

B. Processes used for measurement of Program Outcome attainment:

CO Attainment scores for each subject obtained by direct assessment tools are mapped to correlated PO or PSO using the course articulation matrix. Similarly, CO attainment scores achieved through indirect assessment tools are also mapped with the correlated PO or PSO.

PO/PSO Attainment (Direct Assessment)

$$= \left[\frac{PO\_CO\ Mapping}{3} \times CO\ Attainment\ (Direct\ Assessment) \right]$$

PO/PSO Attainment (Indirect Assessment) =

$$\left[\frac{PO\_CO\ Mapping}{3} \times CO\ Attainment\ (Indirect\ Assessment) \right]$$

Attainment for a program outcome is finally computed by taking weighted average of contributions of participating courses towards that particular PO or PSO.

Finally, program outcomes for the entire course is assessed by taking weighted sum of direct and indirect assessment as

Overall PO/PSO = 80% weightage of direct PO Score + 20% weightage of Indirect PO Score

Table 1 below shows the frequency of data collection of each form.

Table 1: Assessment tools, frequency of data collection and weightage

Assessment Tool	When data is collected	Frequency of Data Analysis	Weightage
Course Portfolio	During the semester	Once in a year	5
Course Survey	End of the semester	Once in a year	4
Graduating Student's Survey	End of the program	Once in a year	3
Alumni Survey	After 2-5 year of graduation	Every 3 years	
Employer Survey		Every 3 years	

On the basis of results of assessment tools, the assessment of level of attainment of each PO or PSO outcome is carried out. The assessment loop for each program outcomes is shown in Figure 2.2.
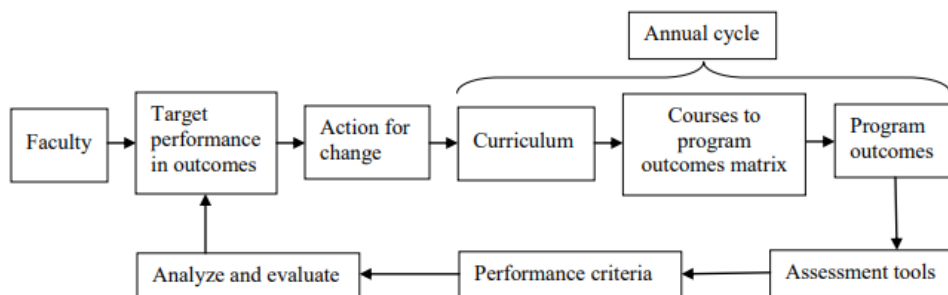

Figure 2. Assessment loop for PO/PSO.

Actions taken based on the results of evaluation of each of the COs, POs & PSOs

Based on the CO, PO, and PSO attainment levels, subjects were identified whose CO attainment level was low but weightage towards calculation of a PO/PSO level was high. For such subjects, the concerned faculty prepared an Action Taken Report (ATR), providing details of reasons for the low attainment level and the actions to improve upon the same (please see Table 2).

Table 2: POs & PSOs Attainment Levels and Actions for Improvement (2022-23)

POs Attainment Levels and Action taken for improvement (2022-2023)

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems			
POs	**Target Level**	**Attainment Level**	**Observations**
PO1	2.1	2.80	• The target level has been achieved for PO1. A total of 35 subjects were examined while computing the attainment level of PO1. • Though the target level has been achieved, but there is a scope for further improvement, as contribution of the some subjects (e.g. UEC301, UEC509, UCS310, UEC612, UEC750, UEC310, UEC752, UES012, UMA035, UMA011, UEC735, UCS303) was observed a little low with respect to some COs. • Thus, the attainment level of PO1 can be further improved by giving attention to these courses. The reasons for low attainment and action taken for

			these courses are given below.

Action Taken Reports:

Subject Name: Analog Electronic Circuits

Subject Code: UEC301

Name of Teacher Submitting the ATR: Dr. Mayank Kumar Rai

Reasons for low attainment of COs

- Lack of understanding in the basic concepts of circuit analysis, network theorem, KVL etc.

- Student pays less attention towards solving the numerical problems.

Action taken for improvement

(a) Action Plan: The learning shall be strengthened through inclusion of more numerical and design-based tutorial problems.

(b) Action Proposed/Taken:

- There will be even more numerical problems involving low frequency and high frequency equivalent BJT models.

- The analysis and derivation of current and voltage relationships has been included in assignments to emphasize conceptual understanding of BJT as an amplifier and oscillator circuit.

Subject Name: Computer Architecture

Subject Code: UEC509

Name of Teachers Submitting the ATR: Dr. Debabrata Ghosh

Reasons for the low attainment of CO-2:

The main reason for low attainment of CO-2 was the fact that students are not able to visualize the concept of pipelining in RISC based machines. A clear understanding of attainment of Average CPI of 1 for pipelined RISC based machines was not achieved amongst students. Therefore, the students were also not able to understand the overhead associated with hazards taking place during pipelining process.

Action taken for improvement:

- Students were shown videos of car assembly plant in the class, which is a real life example of pipelining.

- Numerical problems related to the overhead caused due to hazards were taken up in the class and tutorials.

- Real life application examples of pipeline overhead were discussed in the class.

Subject Name: Database Management System

Subject Code: UCS310/UEC716

Name of Teacher Submitting the ATR: Dr. Shubhra Jain and Dr. Punit Kumar

Reasons for low attainment of CO-4

- Transactions are abstract operations that span multiple interactions with a database. Visualizing and grasping their flow can be challenging without practical examples.

- Different isolation levels (e.g., Read Uncommitted, Read Committed, Serializable) can be confusing to differentiate and understand in terms of their impact on data consistency and performance.

- Concepts like deadlocks, where multiple transactions wait for each other and strategies to manage locks effectively require a deep understanding of transaction control mechanisms.

Actions taken for improvement

- To improve the understanding of transactions in DBMS, we will consider practical exercises, hands-on projects, interactive simulations, and real-world case studies.

- Providing opportunities for students to experiment with transactional scenarios, learn from mistakes, and connect theoretical concepts to practical scenarios can greatly enhance their comprehension of this crucial aspect of database management.

Subject: Digital System Design

Subject Code: UEC612

Name of Teacher Submitting the ATR: Dr. Manu Bansal

Reason for low attainment of CO:

- The students were found lagging in the theory of finite state machines.

- To overcome this issue, additional lecture classes, that would be taken when this subject will run in next semester to strengthen the concept of finite state machines and how to draw Moore and Mealy machine.

- Formative continuous assessments and peer-to-peer learning would be encouraged to overcome this.

- To clarify the concept related to the finite state machines, some online videos and animation will be taken up for next time during the lecture delivery.

- More emphasis will be given on self-learning in the tutorial classes which will encourage the students to enhance their concepts.

- Self/peer-to-peer learning will be emphasized which shall enable the students to

independently solve the problems by both Moore and Mealy Machines.

Action taken for improvement:

- The learning will be strengthened through more detailed lectures, animation, and online videos.
- The students were found lagging in implementation of digital circuits using Moore machine or Mealy machine.
- To overcome this problem, e-content of the course already available on LMS to students will be reviewed and prepared again and uploaded on the learning management system (LMS).
- Moreover, additional lecture classes are planned for students when this subject runs in next semester to strengthen the concepts.
- To enhance the interest of students related to these topics formative continuous evaluations is one way.

Subject Name: MOS Circuit Design

Subject Code: UEC750

Name of Teacher Submitting the ATR: Dr. Anil Singh/Dr. Rajneesh Sharma

Reason for low attainment of COs:

Students were found having somewhat missing basic knowledge of MOSFET fundamentals, and MOSFET based digital/analog circuits. This may be due to the online nature of classes during COVID-19 period while studying these.

Actions taken for improvement:

- To clarify the concept related to the physics of the MOS device, some initial classes will be taken up for next time during the lecture delivery.
- More emphasis will be given on self-learning in the tutorial classes which will encourage the students to enhance their concepts.
- Self/peer-to-peer learning will be emphasized which shall enable the students to independently solve the problems related to MOS basic structure and its working method.
- More emphasis will be given on the assignments, continuous assessments, and peer-to-peer learning.

CO wise action taken report:

For CO-1:

- Additional lecture classes will be planned for students when this subject runs.
- Additional problems specific to digital and analog circuits will be given as an assignments.

For CO-2:

- Additional lecture classes will be planned for students when this subject runs.
- Online videos covering fabrication of MOS/CMOS transistor will be provided to the students to make it clearer.

CO-3:

- Additional lecture classes will be planned for students when this subject runs.
- More numerical problems in the form of assignments, having static and dynamic behavior of CMOS inverter and logic gates, will be given to the students for their learning.
- More emphasis will be given while doing the laboratory work for their better understanding of static and dynamic behavior of logic gates.

Subject Name: Information and Communication Theory

Subject Code: UEC310

Name of Teacher Submitting the ATR: Dr. Amit Mishra

Reasons for the low attainment of CO:

Proficiency in solving probability-based problems is a requirement before taking the 'Information and Communication Theory' course. These probability concepts are integral to the mathematics syllabus and are taught within the domain of the mathematics department. Students are expected to possess a solid grasp of this material, and thus, a concise review of these topics is conducted within the 'Information and Communication Theory' curriculum. Nonetheless, it is evident that students struggle to form a solid grasp of the subjects concerning random variables, indicating a requirement for a deeper understanding to achieve clarity in these concepts.

Actions taken for improvement:

The faculty member who will engage this subject in future must adopt following suggestion to avoid this situation:

- Faculty members will be kindly urged to provide additional attention to the students, ensuring the thorough comprehension of fundamental random variables.
- Furthermore, faculty will be counselled to inspire students to invest time and diligence in enhancing their grasp of solving more problems on random variables and processes concepts.
- Additionally, students will be motivated to actively engage with faculty by posing questions and seeking elucidation, fostering a supportive learning environment.

Subject Name: IC Fabrication Technology

Subject Code: UEC752

Name of Teacher Submitting the ATR: Dr. Robin Singla

Reasons for low attainment of COs

CO-3: This CO covers all the IC fabrication steps and students find difficulty to remember and write all the steps in correct order in single answer. Another reason is that there is no tutorial in

this course so didn't practice the questions related to the CO.

CO-4: The students usually find difficult to understand the concepts of IC packaging. As it is the last unit of the syllabus and only three small topics are mapped to complete one CO so many students skip this topic during exam preparation. Another reason is that there is no tutorial in this course so didn't practice the questions related to the CO.

Actions taken for improvement:

CO-3: Supplementary practice problems will be given to the students for bettering the performance of the students on this topic.

CO-4: An assignment will be given on the IC packaging to encourage better participation of the students in this CO.

Subject Name: Engineering Materials

Subject Code: UES012

Name of Teacher Submitting the ATR: Dr. Jayant Kolte

Reasons for low attainment of COs

CO-1: Major portion of CO1 was covered in tutorial classes.

CO-2: This CO involves practice problems which are covered in tutorial classes where students get limited time to practice them.

CO-5: This portion was covered as the last unit immediately prior to the end semester examination. Students were not able to practice related problems due to scarcity of time.

CO-6: This portion was covered as the last unit immediately prior to the mid semester examination. Students were not able to practice related problems due to scarcity of time.

Actions taken for improvement

CO-1: This portion is now taught both in tutorial and lecture classes.

CO-2: The practice problems will be covered in the lecture class. Also, additional set of practice problems will be provided to students as an assignment/homework for better practice.

CO-5: This portion will be covered in class well before the end semester examination so that students will get sufficient time to study and practice related problems. Also, some numerical related to this topic are added in the tutorial.

CO-6: This portion will be covered in class well before the mid semester examination so that students will get sufficient time to study and practice related problems. Also, some numerical related to this topic are added in the tutorial.

Subject Name: Optimization Techniques

Subject Code: UMA035

Name of Teacher Submitting the ATR: Dr. Bhuvaneshvar Kumar/Dr. Rajesh Dhayal

Reasons for low attainment of CO-1/2/5

- One of the primary reasons is the lack of fundamental concepts of basic mathematics. This deficiency hinders their ability to comprehend more advanced topics and perform well in Optimization Techniques.

- Earlier in this course, we used to have tutorials where they solved numerical problems, which helped them score better marks. However, now this practice is missing, and it could be one of the reasons for the lower achievement of CO.

- The numerical problems in the course are not difficult but require lengthy calculations. Even though students feel they have understood the numerical problems, due to a lack of practice, they perform poorly and make many calculation mistakes, leading to different results and low scores.

- I could also sense that students don't consider Maths one of their major courses; therefore, the competition from their peer group is lacking, and the students don't work as seriously.

Actions taken for improvement

- The faculty will be requested to give extra attention to the ENC students for covering basics of engineering mathematics.

- The faculty will also be advised to motivate the students to dedicate time and effort for improving their understanding of the subject matter.

- In addition to this, students shall be encouraged to ask questions and seek clarification from faculty members.

Subject Name: Numerical Analysis

Subject Code: UMA011

Name of Teachers Submitting the ATR: Dr. Vivek, Dr. Md Hasanuzzaman

Reasons for the low attainment of CO:

- Tutorial classes have been removed from the course. Therefore, students were not able to practice and clear their doubts properly.

- The course UMA011 floated for the branches CS, COE, ENC and ECE. The paper was set difficult as majority of students belongs to the branches CS and COE. Therefore, the students of ENC could not perform well in comparison to the other branches.

Action taken for improvement:

- Students will be advised to practice more problems and visit the instructors involved in the course to clear their doubts.

- Instructors will be advised to solve more numerical examples in their respective lectures.

Subject Name: Big Data Analytics

Subject Code: UEC735

Name of Teacher Submitting the ATR: Dr. Debayani Ghosh

Reasons for low attainment of CO:

- The students were found lagging in concepts related to identify the issues and challenges related to Big Data (CO-1) and design efficient algorithms for mining the data from large volumes (CO-2).
- The main reason behind this is the fact that the students were not able to solve numerical problems on the said topics.
- To overcome this problem, e-content of the course with detailed solved numerical problems has been prepared and uploaded on the learning management system (LMS).

Actions taken for improvement:

- As a proposed action taken plan, next time onwards more time would be devoted to these topics so that the students have a better understanding of the course and can perform well.
- The concepts will be dealt in a more detailed way with more problems solving in the regular classes.
- To overcome this issue, additional lecture classes would be taken when this subject will run in next semester to strengthen the concept related to CO-1 and CO-2.

Subject Name: Operating Systems

Subject Code: UCS303

Name of Teacher Submitting the ATR: Dr. Ram Kishan Dewangan

Reasons for low attainment of CO-5:

CO-5 includes topics like Critical-Section Problem, Peterson's Solution, Synchronization, Synchronization-Hardware solution, Mutex locks, Synchronization-Semaphores, Synchronization-Classic Problems of Synchronization. The concepts of correlation with examples are frequently used in these topics. But these results need to be practice at a regular interval to get more confidence. The reason for leading to poor performance in the CO-5 is incorrect application of the concepts.

Actions taken for improvement

Supplementary practice problems were given to the students for betterment of the performance of the students on these topics.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
POs	Target Level	Attainment Level	Observations

POs	Target Level	Attainment Level	Observations
PO2	2.1	2.77	• For PO2, the target level was achieved. A total of 34 subjects were considered for calculating the attainment level of PO2. • Though the attainment level was better than the set target, but there was scope for further improvement as contribution of a few subjects (UEC301, UEC509, UEC612, UEC750, UEC310, UEC752, UES012, UMA035, UMA011, UEC735, UCS303) towards attainment of this program objective were observed to be low. All these courses had shown low CO attainment levels with respect to some COs. Thus, the attainment level of PO2 can be further improved by taking actions to improve the attainment level of COs of these courses. • The ATRs for these courses have already been provided in PO1.

PO3: Design/development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

POs	Target Level	Attainment Level	Observations
PO3	2.1	2.79	• The target level has been achieved for PO3. A total of 32 subjects were considered for calculating the attainment level of PO3. Although attainment level was achieved, but keeping in view the further scope of improvement, courses that could have further improved the score were identified. • The identified courses with low scores in some COs are UEC301, UCS310, UEC612, UEC750, UEC310, UEC752, UES012, UMA035, UMA011, UEC735, UCS303. The ATRs for these courses have already been provided in PO1.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the

information to provide valid conclusions.

POs	Target Level	Attainment Level	Observations
PO4	2.1	2.84	• For PO4, the attainment level is well above the target level. A total of 26 subjects were considered for calculating the attainment level of PO4. • For further improvement in the attainment level, the identified courses with low score in some COs are UEC301, UCS310, UEC612, UEC750, UEC310, UEC752, UEC735, UCS303. An action taken report was sought from the concerned faculty of these courses and included in PO1.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

POs	Target Level	Attainment Level	Observations
PO5	2.1	2.80	• The target level was achieved for PO5. A total of 27 subjects were considered for the calculation of the attainment level of PO5. • Though the attainment level was better than the set target, the contributions of UEC612, UEC750, UEC752, UES012, UMA035, UMA011, and UEC735 towards the attainment of this program objective were observed to be low. Thus, the attainment level of PO5 can be further improved by taking appropriate actions to improve the attainment level of COs. The ATRs for these courses have already been provided in PO1.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

POs	Target Level	Attainment Level	Observations
PO6	2.1	2.86	• For PO6, the attainment level was calculated using 10 subjects. The attainment level is well above the

POs	Target Level	Attainment Level	Observations
			target value.
			• In the overall attainment score of this PO, the contribution of UEC735 was less as compared to the other courses. Hence, ATR was sought for this course. The observations and actions pertaining to UEC735 is provided in PO1.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

POs	Target Level	Attainment Level	Observations
PO7	2.1	2.78	• The target level was achieved. • A total of 06 subjects were considered for the calculation of the attainment level of PO7. The attainment level is achieved and well above the target value. • The contribution of the course UEC752 is found to be very less towards PO7 compared to the other considered courses. Hence, ATR for this course was asked. The reasons for low attainment in this course and action taken are included in PO1.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

POs	Target Level	Attainment Level	Observations
PO8	2.1	2.94	• Total four courses were mapped to evaluate this PO. • The attainment level was well above the target level. • Each course individually scored the attainment level and hence, the average score is well above the target level.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

POs	Target Level	Attainment Level	Observations

POs	Target Level	Attainment Level	Observations
PO9	2.1	2.76	- For PO9, the target level was well achieved. - A total of 10 subjects were considered for calculating the attainment level of PO9. - The overall attainment is good. However, improvement in UEC301 and UEC735 is needed as this would further improve the PO score. Thus, ATR for these courses was obtained, and the same has been provided in PO1.

PO10: Communication: : Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

POs	Target Level	Attainment Level	Observations
PO10	2.1	2.91	- The target level was achieved. A total of 07 courses were considered for calculating the attainment level of PO10. - Each course individually scored the attainment level; hence, the average score is well above the target level.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

POs	Target Level	Attainment Level	Observations
PO11	2.1	2.92	- The target level was achieved for PO11. A total of 05 courses were considered for calculating the attainment level of PO11. - Each course individually scored the attainment level, and hence, the average score is well above the target level.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

POs	Target Level	Attainment Level	Observations
PO12	2.1	2.88	• For PO12, a total of 11 courses were considered for calculating the attainment level. The attainment level is well above the set target. • It is observed that the contribution of courses like UEC509 and UES012 is less towards PO12. Hence, for further improvement, the ATR of these courses was obtained from the concerned faculty, and the same has been provided in PO1.

PSOs Attainment Levels and Actions for Improvement

PSO1: Ability to apply the fundamentals of mathematics, science, and engineering knowledge to identify, formulate, design, and investigate complex problems for system architecture, multimedia, database, networking, web design, and information security.

PSOs	Target Level	Attainment Level	Observations
PSO1	2.1	2.77	• For PSO1, the target level was achieved. • A total of 35 courses were considered for calculating the attainment level of PSO1. • Action taken for the courses which requires further improvement is already discussed from PO1 to PO12. • Attainment level shows that the ENC students are good in applying fundamental knowledge to solve engineering problems.

PSO2: Apply the appropriate engineering techniques using modern hardware and software tools in electronic and computer engineering to engage in lifelong learning, being ethical to successfully adapt to a multi-disciplinary environment.

PSOs	Target Level	Attainment Level	Observations
PSO2	2.1	2.80	• The attainment level for PSO2 is well above the target level. • A total of 35 courses were considered for

			calculating the attainment level of PSO2.
			• Attainment level shows that ENC students have good engineering competency.
			• Action taken for the courses which require further improvement are already discussed from PO1 to PO12.

Program Outcomes once mapped to the learning outcomes of a particular course gives us an insight of the level of achievement of students in that particular PO. Given this broaden picture of new understanding, we get an opportunity to improvise through initiatives and also implement certain changes that can be lead us to have better performances. For example, in an outcome measurement related to ability to identify and formulate problems for engineering system was assessed through courses that basically require an understanding of engineering problems and its formulation which may lead to problem solving. Therefore, in order to further strengthen student learning, we implemented a paradigm shift in teaching from **Teacher Centric to Student Centric Learning Approach**. This concept was introduced to the faculty through **Centre for Academic Practices and Student Learning (CAPSL)** training workshop which started in year 2016. All faculty from the department have been completed the basic course of New Direction Program and benefitted through this workshop. Faculty was trained to adopt academic practices such as outcome based learning, creative thinking, introducing assessment methods involving students, and many more. With these approaches, students were more open to creatively formulate problem.

On the other hand, where student is assessed for his/her ability to solve complex engineering problems, role of problem solving through tutorials becomes very important. While student centric approach did help in 2018-2019 but a marginal fall was visible in 2019-2020. One of the main reasons for this can be attributed to a shift to an **Online Mode of Teaching because of COVID pandemic**. Many of the courses covered in this category were from even semester such as Antenna and wave propagation (UEC747), signals and systems (UEC404), i.e January-June, 2020. Faculty was still in a learning mode to teach online and conduct tutorials. Lecture/Tutorial sessions needed to be channelized in less time. As a result, **Thapar Learning Management System (TIET-LMS)** was developed and effective July 2020, all academic activities are conducted through it, and reviewing tutorials has also now become seamless. It is anticipated that with the coming up of TIET-LMS, we foresee a positive improvement in this regard in the future.

We strongly believe that a static curriculum cannot bring in changes in the understanding and applying engineering design to produce solutions in the context of global, cultural, social, environmental and economic factors. Keeping this in view, our scheme and syllabi are updated from time to time. A Board of Studies (BOS) meeting is held on a regular basis wherein an expert opinion is sought from Industry and Academic experts in the field of electronics and communication as well as electronics and computer engineering. Based on their suggestions, curriculum is modified and updated to match with the latest market trends. The scheme is then sent to the Senate for approval. One of the recent and major changes that we have incorporated in our Curriculum includes:

- Four elective baskets have been offered to B.E. Electronics and Communication Engineering students admitted in 2019 onwards after the end of Second Year. These elective baskets are:

  - Signal processing

  - Computing

  - VLSI

  - Communication systems

- B.E. (Electronics and Computer Engg.) program also offers students to choose EF (Elective Focus) from Financial Derivative (Future First Collaboration). Student will have to continue all the electives from this group.

- The course syllabi, for these newly included courses, has been carefully designed giving due consideration to suggestions and rectifications proposed by the experts called from academia and industry both, during Board of Studies meetings held in the year 2020.

Over the past three years, particularly, we are laying **more stress on writing and presentation skills**. Casual, unprofessional writing is no more accepted in project report, capstone, or laboratory reports etc. This is keeping in view the need to communicate effectively with range of audiences through writing, with peers and with people in professional organizations. Now students have to undertake several proof reading before the final report is accepted for evaluation purposes. Several templates of project writing have been prepared by the faculty and are circulated to students much before the submission time. Students are encouraged to read research papers and asked to bring in a small write up, which becomes useful in undertaking a Capstone Project (UEC 797). Students who go for project semester are exclusively judged for their writing and communications skills by their Industrial Mentor, which in itself is a motivation for students to work harder even when outside the campus.The **Centre for Training & Development (CTD) on campus** has been established to build upon the communication skills through lecture series, workshops and several other activities. We do see several benefits emanating from this Centre and we expect that a positive change will be reflected in the PO score over the next few years.

We have managed to continuously improve in our outcomes related to experimentation, analyzing and interpreting data for making informed engineering judgments. **Experiential Learning Centre (ELC)** activities have been introduced recently and at very early stage in the curriculum. Several activities have been accomplished successfully as ELC activities in the last 2 years such as:

- **PCB Fabrication**
- **IoT based Systems**
- **DC Power Supply Design**
- **FM Radio Transmitter**
- **PCB Design & Fabrication**
- **HDL Implementation of Digital Clock**

Many more such experiential activities are lined up for all Ist –Vth Semester BE ECE and ENC students to give them Hands-On-Training as well as experience of real life field problems and applications. Few glimpses of the experiential learning centre events held at DECE are shown in **Fig. 3-4**. These activities do not contribute to the total credits earned, rather are an initiative to inculcate team spirit and make students learn to design, fabricate and commission a real world problem while working in a team. This puts the students in a practice to do more similar projects (e.g. Capstone project, group design project, project semester) in their latter part of the curriculum.

Figure 3. Students involved in DC power supply design.

Figure 4. Students involved in IoT: Internet of Things.

Over the past 5 years, a continuous effort to inculcate best practices for experimentation, design and project execution requires a major flip given to support facilities in different laboratories.

The facilities are strengthened in the area of,

● One dedicated Capstone Project laboratory has been setup in the department which is equipped with modern instruments and tools to fabricate and test various hardware design-based capstone projects. This lab is equipped with various soldering stations, digital storage oscilloscope (DSO), multimeter, function generators, computer systems and other consumables.

● One dedicated laboratory has been setup in the department for performing activities under Experiential Learning Centre (ELC). This lab is equipped with various tools and instruments like Spectrum analyzer, PCB prototyping machine, PCB Drilling Machine, UV Exposure Machine, PCB Etching Machine.

PCB Curing Oven, Photoresist DIP Coating Machine, Film Making Unit, soldering station, multimeters, function generators and DSOs which are required to perform hardware-based experiments.

- TIET, Patiala has initiated a student satellite project named ThapSat under the Electronics and Communication Engineering Department (ECED). The objective of this project is to provide a wonderful and real time learning experience for students by experiencing remote sensing technology. In this project, the students are working on the development of a Nano-satellite to monitor the pollution content in the Punjab region. ThapSat Lab incorporates the facilities for the satellite payload design and integration, testing and measurement, and satellite data processing. ThapSat is one of the ambitious projects of TIET designed in support to achieve educational goals in terms of applied engineering concepts.

- Another project lab in the department is dedicated to the subject Engineering Design Project-II (UTA014) for the students of IInd year of engineering. This lab is equipped with approx. 150 (ARD) Arduino based Robocars, 50 (ARM) ARM based Robocars and 30 Dell Workstations (OptiPlex 7010). It is also equipped with various consumables and tools required to perform hardware implementation-based experiments such as soldering stations, hardware tool kit, multimeters, pliers, wire cutters, flux, solder, connecting wires etc.

- The department has purchased one set of Cognitive Radio kit for the evaluation of spectrum sensing algorithms for different sensing methods, sensing characteristics and transmission parameters.

- The department has also added two experimental kits for carrying out antenna measurements experiments in the Microwave and Antenna Lab. This will help the students gain an insight of the basic radiation parameters of antennas and their analysis.

- The department has excellent research laboratories (SMDP Chip to System Design) in the area of VLSI Design. VLSI design laboratory with all the modern tools (e.g. CADENCE, SYNOPSYS, Mentor Graphics, XILINX based gate array design & programming tools, etc.) and hardware in the form of servers and good number of workstations for research and coursework. It allows students to get involved in chip design and get real time chip testing exposure.

- Microcontroller and Embedded System laboratory has been upgraded as per the revised curriculum of the UG/PG programs. This lab is equipped with approx. 25 kits of ARM Microcontroller Based Embedded System. This lab is also equipped with 30 desktops machines for the purpose of programming on Raspberry pi and ARM microprocessors for implementation of hardware projects on Arduino microcontrollers and Raspberry pi.

● One dedicated Manufacturing Techniques Lab has been set up in the department to develop skill, knowledge and hands-on experience to work on different vacuum-based deposition techniques, understanding of nucleation and growth of thin films and their different characterization for various electronic applications. The lab is equipped with modern deposition systems and characterization tools to test the different properties of the thin films. This lab is also equipped with a Thermal Evaporation Chamber, Sputtering Chamber, Semiconductor Parametric Analyzer, and other consumables.

● The new course on Innovation and Entrepreneurship with self-effort hours has been introduced to nurture innovative thinking and entrepreneur skills.

● The department used to share computing facilities with the Computer Science & Engineering Department in the past. Given the need for more resources for better learning and performance in academic and hands-on activities, the ECED has established new computing laboratories. These labs are already functional. The new labs which are added are mentioned as follows:

• Artificial Intelligence Laboratory

• Data Structures and Algorithms Laboratory

• IoT Laboratory

• General Computing Laboratory

ANNEXURE-I

SAMPLE FILLED STUDENT SURVEY FORMS:

Survey form to assess the level of attainment of student outcomes – Graduating Students

The program of BE in Electronics and Communication Engineering// Electronics and Computer Engineering has been designed with certain student outcomes (the knowledge, skills and attitudes that students develop during the course of study). The students of graduating class are requested to answer the questionnaire given in this form to assess how well they judge they have attained the student outcomes set for the program. Please answer the questionnaire on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

S. No.	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
a)	How comfortable are you to apply knowledge of mathematics, science, and engineering?				✓	
b)	Has the program enabled you to design and conduct experiments, as well as to analyze and interpret data?				✓	
c)	Do you have an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?			✓		
d)	Whether the program provides the ability to function in multidisciplinary teams?					✓
e)	Whether the program provides the ability to identify, formulate, and solve engineering problems			✓		
f)	Has the program enabled you to understand the ethical and professional responsibility?					✓
g)	Has the program enabled you to communicate effectively?					✓
h)	Do you agree that the broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?				✓	
i)	Do you have a recognition of the need for, and an ability to engage in life-long learning?				✓	
j)	Do you get the knowledge of contemporary issues?			✓		
k)	Whether the program provides an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?			✓		

What do you plan to do after graduation at TIET.?

Employment (give details like employer name): **ZS Associates, New Delhi**

Student Name and Signature: **Deekshita Gupta**

Regd. No.: **101806116**

Graduating Year: **2022**

Suggestion, if any: **None**

Survey form to assess the level of attainment of student outcomes – Graduating Students

The program of BE in Electronics and Communication Engineering// Electronics and Computer Engineering has been designed with certain student outcomes (the knowledge, skills and attitudes that students develop during the course of study). The students of graduating class are requested to answer the questionnaire given in this form to assess how well they judge they have attained the student outcomes set for the program. Please answer the questionnaire on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

S. No.	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
a)	How comfortable are you to apply knowledge of mathematics, science, and engineering?					5
b)	Has the program enabled you to design and conduct experiments, as well as to analyze and interpret data?					5
c)	Do you have an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?					5
d)	Whether the program provides the ability to function in multidisciplinary teams?					5
e)	Whether the program provides the ability to identify, formulate, and solve engineering problems				4	
f)	Has the program enabled you to understand the ethical and professional responsibility?				4	
g)	Has the program enabled you to communicate effectively?				4	
h)	Do you agree that the broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?					5
i)	Do you have a recognition of the need for, and an ability to engage in life-long learning?					5
j)	Do you get the knowledge of contemporary issues?					5
k)	Whether the program provides an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?				4	

What do you plan to do after graduation at TIET ?

(a) Employment (give details like employer name): Member Technical Staff in Mentor Graphics(Siemens EDA)

(b) Higher education (give the title of degree): B.E

(c) Entrepreneur (specify): NAN

Student Name and Signature: Sachikita

Regd. No.: 101806141

Graduating Year: 2022

Suggestion, if any. Please try to introduce some latest skills like VLSI and web technology development and soft skills programs in the first year.

Survey form to assess the level of attainment of student outcomes – Graduating Students

The program of BE in Electronics and Communication Engineering// Electronics and Computer Engineering has been designed with certain student outcomes (the knowledge, skills and attitudes that students develop during the course of study). The students of graduating class are requested to answer the questionnaire given in this form to assess how well they judge they have attained the student outcomes set for the program. Please answer the questionnaire on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

S. No.	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
a)	How comfortable are you to apply knowledge of mathematics, science, and engineering?					5
b)	Has the program enabled you to design and conduct experiments, as well as to analyze and interpret data?					5
c)	Do you have an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?					5
d)	Whether the program provides the ability to function in multidisciplinary teams?					5
e)	Whether the program provides the ability to identify, formulate, and solve engineering problems					5
f)	Has the program enabled you to understand the ethical and professional responsibility?					5
g)	Has the program enabled you to communicate effectively?				4	
h)	Do you agree that the broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?					5
i)	Do you have a recognition of the need for, and an ability to engage in life-long learning?					5
j)	Do you get the knowledge of contemporary issues?					5
k)	Whether the program provides an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?					5

What do you plan to do after graduation at TIET.?

(a) Employment (give details like employer name): Pocketly

(b) Higher education (give the title of degree): No

(c) Entrepreneur (specify): No

Student Name and Signature: Keshav   Regd. No.: 101856002

Graduating Year: 2022

Suggestion, if any: No

SAMPLE FILLED EMPLOYER SURVEY FORMS:

Survey form to assess the level of attainment of student outcomes – Employer

Dear Sir

We express our sincere thanks for continually employing our graduate students over the years. We are sure our student are sufficiently equipped not only to take on the real world but also make a better place to live in through responsible and innovative use of technology.

We solicit your feedback on attainment of the student outcomes (the knowledge, skills and attitudes that students develop during the course of study at TIET) of the BE Electronics and communication Engineering program/ Electronics and Computer Engineering program. Please answer the following questions on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)		
		Your engineers need	TIET preparation	Overall
a)	Do our students have an ability to apply knowledge of mathematics, science, and engineering?	5	5	10
b)	Do our students have an ability to design and conduct experiments, as well as to analyze and interpret data?	5	5	10
c)	Do our students have an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?	5	5	10
d)	Do our students have an ability to function on multidisciplinary teams?	5	5	10
e)	Do our students have an ability to identify, formulate, and solve engineering problems?	5	5	10
f)	Do our students have an understanding of professional and ethical responsibility?	5	5	10
g)	Do our students have an ability to communicate effectively?	5	5	10
h)	Do our students have the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?	5	4	9
i)	Do our students have recognition of the need for, and an ability to engage in life-long learning?	5	5	10
j)	Do our students have knowledge of contemporary issues?	5	4	9
k)	Do our students have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?	5	5	10

(1) What courses/topics would you like to see offered as UG course at TIET or for continuing education to your staff.

    Web Development, iOS/Android Development

(2) Overall, how satisfied are you with BE Electronics and communication Engineering program/ Electronics and Computer Engineering program at TIET and in your opinion how well is the BE program meeting its stated educational objectives. Cross-out whichever not applicable: **Excellent**/V. good/Good/Avg./Poor

Your Name and Signature with date: **Ishant Kumar, 28 May 2021**

Your Organization Name: Auribises Technologies Pvt. Ltd, Ludhiana

Suggestion, if any: ----

Survey form to assess the level of attainment of student outcomes – Employer

Dear Sir

We express our sincere thanks for continually employing our graduate students over the years. We are sure our student are sufficiently equipped not only to take on the real world but also make a better place to live in through responsible and innovative use of technology.

We solicit your feedback on attainment of the student outcomes (the knowledge, skills and attitudes that students develop during the course of study at TIET) of the BE Electronics and communication Engineering program/ Electronics and Computer Engineering program. Please answer the following questions on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.
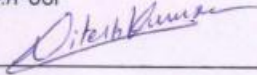
	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)		
		Your engineers need	TIET preparation	Overall
a)	Do our students have an ability to apply knowledge of mathematics, science, and engineering?	4	4	4
b)	Do our students have an ability to design and conduct experiments, as well as to analyze and interpret data?	5	3	4
c)	Do our students have an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?	5	4	5
d)	Do our students have an ability to function on multidisciplinary teams?	5	3	4
e)	Do our students have an ability to identify, formulate, and solve engineering problems?	5	5	5
f)	Do our students have an understanding of professional and ethical responsibility?	5	4	5
g)	Do our students have an ability to communicate effectively?	4	4	4
h)	Do our students have the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?	4	3	3
i)	Do our students have recognition of the need for, and an ability to engage in life-long learning?	3	3	3
j)	Do our students have knowledge of contemporary issues?	3	3	3
k)	Do our students have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?	4	3	4

(1) What courses/topics would you like to see offered as UG course at TIET or for continuing education to your staff.

Introduce Web/Software development languages too

(2) Overall how satisfied are you with BE Electronics and communication Engineering program/ Electronics and Computer Engineering program at TIET and in your opinion how well is the BE program meeting its stated educational objectives. Cross-out whichever not applicable: Excellent/V. good/Good/Avg./Poor

Your Name and Signature with date: _Nitesh Kumar_   _Nitesh Kumar_

Your Organization Name: _Avis technologies_

Suggestion, if any: _____

Survey form to assess the level of attainment of student outcomes – Employer

Dear Sir

We express our sincere thanks for continually employing our graduate students over the years. We are sure our student are sufficiently equipped not only to take on the real world but also make a better place to live in through responsible and innovative use of technology.

We solicit your feedback on attainment of the student outcomes (the knowledge, skills and attitudes that students develop during the course of study at TIET) of the BE Electronics and communication Engineering program/ Electronics and Computer Engineering program. Please answer the following questions on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)		
		Your engineers need	TIET preparation	Overall
a)	Do our students have an ability to apply knowledge of mathematics, science, and engineering?	5	4	4
b)	Do our students have an ability to design and conduct experiments, as well as to analyze and interpret data?	5	4	4
c)	Do our students have an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?	4	4	4
d)	Do our students have an ability to function on multidisciplinary teams?	5	4	4
e)	Do our students have an ability to identify, formulate, and solve engineering problems?	5	4	4
f)	Do our students have an understanding of professional and ethical responsibility?	5	5	5
g)	Do our students have an ability to communicate effectively?	5	4	5
h)	Do our students have the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?	5	4	4
i)	Do our students have recognition of the need for, and an ability to engage in life-long learning?	5	4	4
j)	Do our students have knowledge of contemporary issues?	3	3	3
k)	Do our students have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?	5	5	5

(1) What courses/topics would you like to see offered as UG course at TIET or for continuing education to your staff.

_____Biomedical Engg_____

(2) Overall how satisfied are you with BE Electronics and communication Engineering program/ Electronics and Computer Engineering program at TIET and in your opinion how well is the BE program meeting its stated educational objectives. Cross-out whichever not applicable: Excellent/V. good/Good/Avg./ Poor

Your Name and Signature with date: ___VIVEK SAINI _____

28-may-21

Your Organization Name:__ PHILIPS INDIA LTD ,HEALTHCARE

Suggestion, if any:_____

_____

AX1

Survey form to assess the level of attainment of student outcomes – Alumni

Dear Alumni

It is wonderful to reconnect with you after a few years. We hope you have been doing exceedingly well in your career. We are sure that your stay with TIET has enabled you to imbibe the process of life-long learning and to take up challenging careers. We are sure you were sufficiently equipped not only to take on the real world but also make it a better place to live in through responsible and innovative use of technology. We need your support to keep the TIET flag flying high.

We solicit your feedback on attainment of the student outcomes (the knowledge, skills and attitude that you developed during the course of study at TIET and subsequent work experience) of the BE Electronics and Communication Engineering program// Electronics and Computer Engineering program. Please answer the following questions on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

S. No.	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)		
		Your employment experience	TIET preparation	Overall
a)	How comfortable were you to apply knowledge of mathematics, science, and engineering?	4	4	4
b)	Has the program enabled you to design and conduct experiments, as well as to analyze and interpret data?	5	4	4.5
c)	How do you rate yourself in designing a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?	3	3	3
d)	Whether the program has enabled you to function in multidisciplinary teams?	5	5	5
e)	Whether the program has provided the ability to identify, formulate, and solve engineering problems?	3	5	4
f)	Has the program enabled you to understand the ethical and professional responsibility?	5	5	5
g)	Has the program enabled you to communicate effectively?	5	4	4.5
h)	Do you agree that the broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?	5	5	5
i)	Do you have recognition of the need for, and an ability to engage in life-long learning?	4	4	4
j)	Do you have achieved the knowledge of contemporary issues?	3	3	3
k)	Whether the program has provided an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?	3	5	4

Note: Cross-out whichever not applicable

(1) GATE exam after BE: Passed/Failed/Not taken   (2) Promotion since graduation: Yes/No

(3) Enrollment in higher studies: Yes/No, if yes please answer following
    (i) Name of program: _NA_____ (ii) Year of completion:__NA_____

(4) Involvement in professional societies as a _NA_____

(5) Community service, if any: _____NA_____

(6) Overall how satisfied are you with BE ECE/ENC program at TIET and in your opinion how well is the program meeting its stated educational objectives: Excellent / V. good / Good / Avg. / Poor

Your Name with signature: Srishty Kak

Your current organization: Mercer-Mettl, Gurgaon

Regd. No.:101615112   Year of graduation: 2020

Suggestion, if any: NA

Survey form to assess the level of attainment of student outcomes – Alumni

Dear Alumni

It is wonderful to reconnect with you after a few years. We hope you have been doing exceedingly well in your career. We are sure that your stay with TIET has enabled you to imbibe the process of life-long learning and to take up challenging careers. We are sure you were sufficiently equipped not only to take on the real world but also make it a better place to live in through responsible and innovative use of technology. We need your support to keep the TIET flag flying high.

We solicit your feedback on attainment of the student outcomes (the knowledge, skills and attitude that you developed during the course of study at TIET and subsequent work experience) of the BE Electronics and Communication Engineering program// Electronics and Computer Engineering program. Please answer the following questions on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

S. No.	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)		
		Your employment experience	TIET preparation	Overall
a)	How comfortable were you to apply knowledge of mathematics, science, and engineering?	5	5	5
b)	Has the program enabled you to design and conduct experiments, as well as to analyze and interpret data?	NA	5	5
c)	How do you rate yourself in designing a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?	NA	5	5
d)	Whether the program has enabled you to function in multidisciplinary teams?	4	4	4
e)	Whether the program has provided the ability to identify, formulate, and solve engineering problems?	5	5	5
f)	Has the program enabled you to understand the ethical and professional responsibility?	5	5	5
g)	Has the program enabled you to communicate effectively?	5	5	5
h)	Do you agree that the broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?	5	5	5
i)	Do you have recognition of the need for, and an ability to engage in life-long learning?	5	5	5
j)	Do you have achieved the knowledge of contemporary issues?	5	5	5
k)	Whether the program has provided an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?	5	5	5

Note: Cross-out whichever not applicable
(1) GATE exam after BE: Passed/~~Failed/Not taken~~   (2) Promotion since graduation. Yes/~~No~~
(3) Enrollment in higher studies: ~~Yes~~/No, if yes please answer following
    (i) Name of program:_____ NA _____ (ii) Year of completion:_____ NA _____
(4) Involvement in professional societies as a _____
(5) Community service, if any: _____
(6) Overall how satisfied are you with BE ECE/ENC program at TIET and in your opinion how well is the program meeting its stated educational objectives: ~~Excellent~~ / V. good / ~~Good / Avg. / Poor~~

Your Name with signature: Shubham Jindal   Your current organization: TI Consultants
Regd. No.: 101306159   Year of graduation: 2017
Suggestion, if any:_____

Survey form to assess the level of attainment of student outcomes – Alumni

Dear Alumni

It is wonderful to reconnect with you after a few years. We hope you have been doing exceedingly well in your career. We are sure that your stay with TIET has enabled you to imbibe the process of life-long learning and to take up challenging careers. We are sure you were sufficiently equipped not only to take on the real world but also make it a better place to live in through responsible and innovative use of technology. We need your support to keep the TIET flag flying high.

We solicit your feedback on attainment of the student outcomes (the knowledge, skills and attitude that you developed during the course of study at TIET and subsequent work experience) of the BE Electronics and Communication Engineering program// Electronics and Computer Engineering program. Please answer the following questions on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

S. No.	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)		
		Your employment experience	TIET preparation	Overall
a)	How comfortable were you to apply knowledge of mathematics, science, and engineering?	5	3	5
b)	Has the program enabled you to design and conduct experiments, as well as to analyze and interpret data?	4	3	4.5
c)	How do you rate yourself in designing a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability?	4.5	4	5
d)	Whether the program has enabled you to function in multidisciplinary teams?	4	2	4.5
e)	Whether the program has provided the ability to identify, formulate, and solve engineering problems?	5	3	4
f)	Has the program enabled you to understand the ethical and professional responsibility?	5	2.5	4.25
g)	Has the program enabled you to communicate effectively?	5	5	5
h)	Do you agree that the broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context?	5	4	4.5
i)	Do you have recognition of the need for, and an ability to engage in life-long learning?	5	4	4.5
j)	Do you have achieved the knowledge of contemporary issues?	5	3	4
k)	Whether the program has provided an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice?	5	2	3.5

Note: Cross-out whichever not applicable
(1) GATE exam after BE: Passed/Failed/Not taken   (2) Promotion since graduation: Yes/No
(3) Enrollment in higher studies: Yes/No, if yes please answer following
   (i) Name of program:_____ (ii) Year of completion:_____
(4) Involvement in professional societies as a _____
(5) Community service, if any: _____
(6) Overall how satisfied are you with BE ECE/ENC program at TIET and in your opinion how well is the program meeting its stated educational objectives: Excellent / V good / Good / Avg / Poor

Your Name with signature _Shefali Dutta Shefali_ Your current organization: _NXP INDIA PVT LTD._
Regd. No. _1018 5017_   Year of graduation: _2022_
Suggestion, if any: _Introduction of Digital Design Systems to all branches like_

Department of Electronics and communication Engineering
Minutes of meeting with faculty members

Ref. No.: ECED/ABET/May-2019
Date: May 21, 2019

A meeting with faculty members has conducted to review the PEOs of the department compiled by the committee members based on feedback received from stakeholders in the seminar hall at 11:30 AM under the chairmanship of HECED. Following faculty members participated the meeting and their suggestions have recorded to finalize the PEOs. A draft with suggestions (PEOs) is listed herewith as annexure-1.

Subject: ABET meeting (PEOs review)

Faculty member	Signature	Faculty member	Signature
Prof. R.S. Kaler		Dr.Mohit Agarwal	
Prof. Rajesh Khanna		Dr.Amanpreet Kaur-II	
Prof. Sanjay Sharma		Dr. Harpreet Vohra	
Prof. .Kulbir Singh		Dr. Rahul Upadhyay	
Cmde(Retd.) Anil Kumar Sharma		Dr. Hari Shankar Singh	Hari shankar Sngh
Dr. Amit Kumar Kohli		Dr.Sumit Vyas	
Dr. Ravi Kumar		Dr.Arun Kumar Chaterjee	
Dr. Sanjay Kumar		Dr.Jaswinder Kaur	Jaswinder Kaur
Dr. Hem Dutt Joshi		Dr. Anil Singh	
Dr.Surbhi Sharma		Dr.Shireesh Kumar Rai	
Dr.Mayank Kumar Rai		Dr. Bharat Garg	
Dr.Urvinder Singh		Dr.Sujit Kumar Patel	
Dr.Hardeep Singh		Dr. Amit Munjal	
Dr. Vinay Kumar		Dr.Debabrata Ghosh	
Dr.Ashutosh Kumar Singh		Dr.Navneet Sharma	
Dr.AnkushKansal		Dr.Pravindra Kumar	P. Kumar
Dr. Manu Bansal		Dr. Rajneesh Sharma	
Dr. Ajay Kakkar		Dr.Mayank Agarwal	Mayank
Dr. Amit Mishra		Dr.Divya Sharma	
Dr. Rana Pratap Yadav		Dr. Dinesh	
Dr. Anil Arora		Mr. Sukhwinder Kumar	
Dr.Karamjit Singh Sandha		Dr.Gaganpreet Kaur	
Dr.Neeru Jindal		Dr.GeetikaDuaSagoo	Geetika
Dr.Amanpreet Kaur-I		Ms. MadhuKushwaha	Madhu
Dr.Rishikesh Pandey		Dr. Teena Narang	
Dr.SuhdhanshuTyagi		Dr.Rajan Gupta	Rajan

HECED

Thapar Institute of Engineering and Technology, Patiala 147004, Punjab (India)
(Deemed to be University)
Phone:+91 1752393021 Email:- registrar@thapar.edu Website:- www.thapar.edu

FACULTY SURVEY

Department of Electronics and Communication Engineering,
Thapar Institute of Engineering and Technology, Patiala

THAPAR INSTITUTE
OF ENGINEERING & TECHNOLOGY
(Deemed to be University)

Dear Faculty member

The Department of Electronics and Communication Engineering, Thapar Institute of Engineering and Technology, Patiala require feedback from our stakeholders i.e. Alumni Members, Employers, parents , students and staff, to gauge whether the B.E. (Electronics and Communication Engineering) programme offered by our department is sufficient in preparing the students to be a competent engineer for professional life after their graduation.

The objectives of the survey are:

1. To collect the suggestions for reviewing the vision and mission of the department.
2. To gather information on the importance of the Program Educational Outcomes (PEO)
3. To gauge our graduates' accomplishments after graduation (PEO).

We are grateful if you could spare some time to complete this survey.

Name   : Hem Dutt Joshi

Designation   : Associate Professor

1. Indicate how well do you agree with mission and vision of the department (refer annexure A and B)

   ☐ Strongly disagree   ☐ Disagree   ☐ can't say   ☐ Agree   ☑ Strongly agree

2. Indicate how well do you agree with each Program Educational Objectives PEOs (refer Annexure C) as a predicted accomplishment for the degree.

Program Educational Objectives (PEO)	Degree of relevance				
	1	2	3	4	5
PEO 1.	☐	☐	☐	☐	☑
PEO 2.	☐	☐	☐	☐	☑
PEO 3.	☐	☐	☐	☑	☐

1-Least relevant   2- Less relevant   3- Can't say   4- relevant   5- Very relevant

3. Do you suggest any changes in the PEOs? (Specify)

PEO-3
(It may include some human value besides
ethical and Professional)

1

4. List a few courses that you wish to include in the B.Tech (Electronics and Communication Engineering) programme which you think are important for building up a good career for the students.

Other suggestions, if any:

Place: Patiala
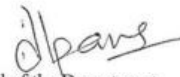Date: April 23, 2019

Signature _____

Name and Designation _Hem dutt Joshi Associate Professor._

The Department of Electronics and Communication Engineering would like to thank you for your willingness in spending your valuable time to complete this questionnaire. Your time and effort is much appreciated.

After completing the form, please send the print out version of this form to the office of HECED.

(N.B: Please refer to the annexure for the details about vision, mission and PEOs of the department)

Head of the Department
Department of Electronics and Communication
Engineering, Thapar Institute of Engineering and
Technology (A deemed to be university), Patiala,
Punjab Pin:147004