

7.1. Actions taken based on the results of evaluation of each of the COs, POs & PSOs (30)

POs & PSOs Attainment Levels and Actions for improvement – CAY only

POs	Target Level	Attainment Level	Observations
PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	2.00	2.33	Target achieved
Action : <ul style="list-style-type: none"> (i) Physics course has been strengthened and modernized to include Quantum Physics. (ii) Syllabus of Mathematics courses has been revamped to strengthen the Math base and Applications. (iii) Students have been encouraged to take up specialization in Electronics or Computer Science to develop additional skills apart from a strong background in the core Electrical Engineering subjects. (iv) Curriculum updates are taken up every year basis to spruce up the curriculum with the latest trends in Engineering. Several new Electives have been started and old one spruced up in the last four years. These include a new elective on Mobile Computing, quantum computing, work experience course on IoT etc. (v) A strong Alumni connect has been created to enable students to pursue their 5 months co-op training in the progressive industries which offer them live projects. These projects give a very good training and exposure to the students who derive a lot of benefit. Some students are also pursuing their training in Advanced Labs internationally in schemes like MITACS and otherwise through referrals and applications. 			
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.			
PO2	2.00	2.27	Target achieved
Action : <ul style="list-style-type: none"> (i) The Department has instituted the Under Graduate Research Award (UGRA) wherein some of the selected UG students are given cash incentive to pursue a well formulated research problem as their Major project with the help of an assigned Faculty mentor. The students can take up these projects in other departments also e.g. Department of Physics and Computer Science if they are interested. These strengthen their Problem Analysis Skills. (ii) Students have been encouraged to participate in the sponsored R&D Projects being carried out in the Department. They are also given incentive under “Earn while you learn” scheme for this work. These provide practical real-life situations for improving problem analysis skills. 			

(iii)	<p>Several Community related real-life projects are being taken up in the Department with the full participation of the students. These provide practical real-life situations for improving problem analysis skills. Some of these are as follows.</p> <ol style="list-style-type: none"> Truck tracking during wheat harvesting for transporting harvest from fields to threshers located near granary. RFID based identification of cattle in Dairy with full database maintenance of feed data, yield data etc enabling precise interventions as necessary. Automatic tracking of Solar Panels Implementation of Smart Solar Grid in the University Energy Audit of the Dayalbagh colony
(iv)	<p>Some students take up projects that they pursue during their co-op internship in the industry for their Major Project. Some of these are as follows.</p> <ol style="list-style-type: none"> Surface defect detection of hot steel rolling products Sentiment Analysis Vehicle identification

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.

PO3	2.00	2.17	Target achieved
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Action 1:

(i)	<p>All the students are required to complete a Design Engineering and Theme Development project in which the emphasis is on learning to follow the complete Design Engineering process from identification of need, problem formulation, generation of ideas, analysis of solutions, preliminary design, verifying technological feasibility and economic viability, detailed design and implementation.</p>
(ii)	<p>All the students are required to complete a Rural Engineering Project wherein they formulate a plan for setting up an industry in a rural setting using locally available resources. This helps in developing an understanding the practical needs of the rural areas and formulating solutions.</p>
(iii)	<p>The Department has instituted the Under Graduate Research Award (UGRA) wherein some of the selected UG students are given cash incentive to pursue a well formulated research problem as their Major project with the help of an assigned Faculty mentor. The students can take up these projects in other departments also e.g. Department of Physics and Computer Science if they are interested. These provide practical real-life situations for improving skills for Design / development of solutions.</p>
(iv)	<p>Students have been encouraged to participate in the sponsored R&D Projects being carried out in the Department. They are also given incentive under “Earn while you learn” scheme for this work. These provide practical real-life situations for improving skills for Design / development of solutions.</p>

- (v) Several Community related real-life projects are being taken up in the Department with the full participation of the students. These provide practical real life situations for improving skills for Design / development of solutions. Some of these are as follows.
- Truck tracking during wheat harvesting for transporting harvest from fields to threshers located near granary.
 - RFID based identification of cattle in Dairy with full database maintenance of feed data, yield data etc enabling precise interventions as necessary.
 - Automatic tracking of Solar Panels
 - Implementation of Smart Solar Grid in the University
 - Energy Audit of the Dayalbagh colony

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

PO4	2.00	1.80	Deficiency : addressed by following actions
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Action 1:

- All the students are required to complete a Design Engineering and Theme Development project in which the emphasis is on learning to follow the complete Design Engineering process from identification of need, problem formulation, generation of ideas, analysis of solutions, preliminary design, verifying technological feasibility and economic viability, detailed design and implementation.
- All the students are required to complete a Rural Engineering Project wherein they formulate a plan for setting up an industry in a rural setting using locally available resources. This helps in developing an understanding the practical needs of the rural areas and formulating solutions.
- Students have been encouraged to participate in the sponsored R&D Projects being carried out in the Department. They are also given incentive under “Earn while you learn” scheme for this work. These provide practical real life situations for improving skills for Design / development of solutions.
- Several Community related real life projects are being taken up in the Department with the full participation of the students. These provide practical real life situations for improving skills for conducting investigations of complex problems. Some of these are as follows.
 - Truck tracking during wheat harvesting for transporting harvest from fields to threshers located near granary.
 - RFID based identification of cattle in Dairy with full database maintenance of feed data, yield data etc enabling precise interventions as necessary.
 - Automatic tracking of Solar Panels
 - Implementation of Smart Solar Grid in the University
 - Energy Audit of the Dayalbagh colony
 - Solar vehicle
 - Driverless car

- (v) Some students take up projects that they pursue during their co-op internship in the industry for their Major Project. These provide practical real life situations for improving skills for Design / development of solutions. Some of these are as follows.
- Surface defect detection of hot steel rolling products
 - Sentiment Analysis
 - Vehicle identification

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations

PO5	2.0	2.1	Target achieved
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Action 1:

- The Department has received FIST II grant through which modern lab facilities have been set up for the students to perform experimentation.
- The Department is a recipient of UGC SAP grant through which modern lab facilities have been set up for the students to perform experimentation.
- The University is completely Solar powered. A Smart Microgrid has been developed indigenously by the department. This is used as a live laboratory by the students for performing experiments, analysis and research.
- The University has a Cluster Computing Facility that the students can use for learning and implementing Parallel Computing.
- The students are encouraged to use the Vidyaprasar portal of the Institute where complete videos and other resources of several courses are available.
- Teachers are also using on-line teaching & evaluation software and the students get familiar with them.

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

PO6	2.0	2.28	Target achieved
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Action 1:

- All the students are required to complete a Design Engineering and Theme Development project in which the emphasis is on learning to follow the complete Design Engineering process from identification of need, problem formulation, generation of ideas, analysis of solutions, preliminary design, verifying technological feasibility and economic viability, detailed design and implementation.
- All the students are required to complete a Rural Engineering Project wherein they formulate a plan for setting up an industry in a rural setting using locally available resources. This helps in developing an understanding the practical needs of the rural areas and formulating solutions.

(iii)	Several Community related real life projects are being taken up in the Department with the full participation of the students. These provide practical real life situations for understanding responsibilities relevant to the professional engineering practice.
(iv)	The students observe the various measures taken up by the Institute in the areas of renewable energy, water harvesting, minimization of energy usage, simple lifestyle, non-polluting transportation using cycles and electric vehicles and learn frugal innovation for solution of pressing problems and consequent responsibilities relevant to professional engineering practice.

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

PO7	2.0	1.93	Deficiency addressed by following actions
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Action 1:

- (i) A compulsory course on Environmental Science has been introduced for better understanding of the environmental issues and how engineering solutions to the problems can be devised
- (ii) DEI has been ranked 5th cleanest University in 2017.
- (iii) DEI has won several awards for implementing the Clean Energy initiatives ...
- (iv) The Institute promotes a culture wherein air conditioners are utilized only in absolutely essential labs and not as a means of luxury / comfort with resulting energy savings.
- (v) Dayalbagh Community follows a way of life that is geared towards sustainability and has been declared as an Eco-village by MNRE.
- (vi) The Institution has increased the involvement of its staff and students in several environment-related activities with the active participation of students and faculty and through the outreach programmes.
- (vii) Tree planting in the campus and in the adopted villages is done regularly as part of the activities of NSS volunteers.
- (viii) Energy conservation is practised by the installation of LED Lamps and LED tube light and energy efficient fans.
- (ix) Water conservation is adopted through rain water harvesting mechanisms

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

PO8	2.0	2.2	Target achieved
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Action 1:

- (i) All the students have to undergo courses on Indian Culture and Comparative Study of religion as a means of promoting harmony and understanding of the Unity in diversity of the country's polity.
- (ii) Ethical practices are promoted by the ethos of Dayalbagh. The day starts with prayer in the assembly in which all students participate.

(iii)	Uniform is compulsory for students for promoting equality and eliminating class consciousness.
(iv)	Students participate in NSS activities and learn that Service to the Society is an important part of professional life.
(v)	Participation in Co-Curricular activities and Games is compulsory and promote commitment to ethical principles and an understanding of sportsmanship and that participation is more important than winning.
(vi)	A comprehensive continuous evaluation system including Daily Home Assignments and Daily Class Assignments inculcates the culture of regularity and punctuality.

PO9 :Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

PO9	2.00	2.06	Target achieved
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Action 1:

- (i) The students have to complete several courses involving team projects like Design Engineering /Theme Development in III year, Rural Engineering Project (REP) in Final year. These teams cut across Departments and enable students to learn to work in teams and in multidisciplinary settings.
- (ii) Student coordinators contribute to the Placement activities and learn leadership skills.
- (iii) The Faculty organizes an Annual Fest called “Sampravah” that is completely managed by the students. Participation is of the order of couple of thousand students across various faculties of the University and this requires good management skills to organize.
- (iv) The Department has a Proctorial System with Batch Prefects and Assistant Prefects being elected representatives of the batch. Similarly there are Class captains and Vice-Captains who take up various responsibilities and learn to lead.
- (v) The Final Year Major project may also be taken up as an individual or a Group activity depending on the project and the students learn to work in teams.

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

PO10	2.0	1.92	Deficiency addressed by following actions
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Action :

- (i) The students are required to complete two Seminar based courses – one in Third year and the other in final year. They give presentations on latest technological topics and these may go beyond the syllabus of theory courses and promote self learning as well as communications skills.
- (ii) All the Lab and Project courses have Viva – voce examinations which are both internal and external and promote good communication skills.
- (iii) Students regularly participate in tech fests outside the Institute and present their papers in Student Contests. The Institute also funds such endeavors.

(iv) The students are required to submit detailed reports on their Project work, lab work and Seminar courses for promoting written communication skills			
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			
PO11	1.5	1.67	Target achieved
Action :			
(i) The students have to complete several courses involving team projects like Design Engineering /Theme Development in III year, Rural Engineering Project (REP) in Final year. These teams cut across Departments and enable students to learn to work in teams and in multidisciplinary settings. (ii) Student coordinators contribute to the Placement activities and learn leadership skills. (iii) The Faculty organizes an Annual Fest called "Sampravah" that is completely managed by the students. Participation is of the order of couple of thousand students across various faculties of the University and this requires good management skills to organize. (iv) The Final Year Major project may also be taken up as an individual or a Group activity depending on the project and the students learn to work in teams.			
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			
PO12	2.0	2.29	Target achieved
Action:			
(i) The students are required to complete two Seminar based courses – one in Third year and the other in final year. They give presentations on latest technological topics and these may go beyond the syllabus of theory courses and promote self learning and prepare students for lifelong learning. (ii) Practical Training at the end of I and II year and co-op Internship at the end of Third year enable students to pursue independent projects in an industrial setting with limited mentorship and prepare for lifelong learning.			
PSO1 : Graduates will be able to analyze, innovate and provide realistic electrical engineering solutions to real life problems			
PSO1	2.00	2.51	Target achieved
Action :			
(i) The Department has instituted the Under Graduate Research Award (UGRA) wherein some of the selected UG students are given cash incentive to pursue a well formulated research problem as their Major project with the help of an assigned Faculty mentor. The students can take up these projects in other departments also e.g. Department of			

	Physics and Computer Science if they are interested. These provide practical real life situations for improving skills for Design / development of solutions.
(ii)	Students have been encouraged to participate in the sponsored R&D Projects being carried out in the Department. They are also given incentive under “Earn while you learn” scheme for this work. These provide practical real-life situations for improving skills for Design / development of solutions.
(iii)	Several Community related real life projects are being taken up in the Department with the full participation of the students. These provide practical real-life situations for improving skills for Design / development of solutions. Some of these are as follows. <ul style="list-style-type: none"> a. Truck tracking during wheat harvesting for transporting harvest from fields to threshers located near granary. b. RFID based identification of cattle in Dairy with full database maintenance of feed data, yield data etc enabling precise interventions as necessary. c. Automatic tracking of Solar Panels d. Implementation of Smart Solar Grid in the University e. Energy Audit of the Dayalbagh colony
(iv)	Some students take up projects that they pursue during their co-op internship in the industry for their Major Project. These provide practical real life situations for improving skills for Design / development of solutions. Some of these are as follows. <ul style="list-style-type: none"> a. Surface defect detection of hot steel rolling products b. Sentiment Analysis c. Vehicle identification

PSO2 : The graduates will acquire adequate practical skills in electrical engineering and develop capacity to work with one’s own hands in order to imbibe vocational and entrepreneurial traits

PSO2	2.00	2.43	Target achieved
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Action:

(i)	Several Community related real life projects are being taken up in the Department with the full participation of the students. These provide practical real life situations for improving problem analysis skills. Some of these are as follows. <ul style="list-style-type: none"> a. Truck tracking during wheat harvesting for transporting harvest from fields to threshers located near granary. b. RFID based identification of cattle in Dairy with full database maintenance of feed data, yield data etc enabling precise interventions as necessary. c. Automatic tracking of Solar Panels d. Implementation of Smart Solar Grid in the University e. Energy Audit of the Dayalbagh colony
(ii)	Some students take up projects that they pursue during their co-op internship in the industry for their Major Project. Some of these are as follows. <ul style="list-style-type: none"> a. Surface defect detection of hot steel rolling products b. Sentiment Analysis c. Vehicle identification
(iii)	The time spent in internship by a student has been significantly increased to provide adequate exposure to industry environment through summer internships and

Cooperative Education training. The Coop training serves dual purpose of providing exposure to industry as well as opportunity to work on real life industry standard problems			
PSO3 : Graduate will be able to specialize in any one of their preferred choice in the area of Electrical Engineering i.e. Electrical Engineering, Electronics and Communications Engineering or Computer Science			
PSO3	2.00	2.5	Target achieved
Action : <ul style="list-style-type: none"> (i) Specialization streams have been started in core electrical engineering, electronics and computer science areas (ii) Number of electives are being offered in all four years of study. 			
PSO4 : Graduate will be able to demonstrate strong commitment to ethics and moral values through his conduct			
PSO4	2.00	2.46	Target achieved
Action : <ul style="list-style-type: none"> (i) Strict discipline is ensured (ii) A number of institute core courses have been included in the curriculum with a view to inculcate moral and ethical values in the graduates (iii) Student participation in various administrative committees is encouraged. 			