

# **Department of Electrical and Instrumentation Engineering**

## **Report on Sustainable Development Goals (SDGs) 2025**

### **SDGs Selected:**

**SDG3 – Good Health and Well-being**

**SDG4 – Quality Education**

**SDG7 – Affordable and Clean Energy**



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

**Thapar Institute of Engineering and Technology**  
**Patiala, Punjab, India**  
**P.O. Box 32, Bhadson Road, Pin -147004**

# **Departmental Sustainable Development Goals (SDGs)**

## **Report**

### **Table of Contents**

|                                                                          |    |
|--------------------------------------------------------------------------|----|
| 1. Introduction:.....                                                    | 3  |
| 1.1. What are the Sustainable Development Goals? .....                   | 3  |
| 1.2. Justification for Selecting SDG3, SDG4, and SDG7 .....              | 4  |
| 2. Brief Details of Activities at Department Level: .....                | 5  |
| 2.1. Activities for SDG3 (Good Health and Well-being):.....              | 6  |
| 2.2. Activities for SDG4 (Quality Education):.....                       | 8  |
| 2.3. Activities for SDG7 (Affordable and Clean Energy):.....             | 12 |
| 3. Events/Programs Conducted.....                                        | 14 |
| 4. SDG Mapping with Departmental Research and Teaching Initiatives ..... | 15 |
| 4.1. SDG Mapping corresponding to ELC Activities .....                   | 15 |
| 4.2. SDG Mapping corresponding to Sponsored Research Projects.....       | 16 |
| 4.3. SDG Mapping corresponding to Capstone Projects .....                | 16 |
| 4.4. SDG Mapping corresponding to Project Semester Projects .....        | 18 |

# **1. Introduction:**

## **1.1. What are the Sustainable Development Goals?**

The Sustainable Development Goals (SDGs) constitute the Global Goals, which were adopted as universal calls to action by the United Nations in 2015 to eradicate poverty, safeguard the planet, and ensure that by 2030, all individuals experience peace and prosperity. There are 17 Sustainable Development Goals (SDGs) in total, which necessitate urgent action from all nations, acknowledging that the eradication of poverty and its associated disparities can only be achieved through diverse strategies that enhance health and education, mitigate inequality, and encourage economic growth, all while addressing climate change and striving to conserve our oceans and forests. To achieve the SDGs in every context, the creativity, know-how, technology and financial resources of the whole of society will be needed. All 17 SDGs are listed as follows.

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation, and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water

15. Life on Land

16. Peace, Justice, and Strong Institutions

17. Partnerships for the Goals

Each goal has specific targets and indicators to guide action across social, economic, and environmental dimensions. Educational institutions, especially technical departments, play a pivotal role in advancing these goals through research, innovation, and outreach, thereby nurturing future leaders and solutions for sustainable development.

## **1.2. Justification for Selecting SDG3, SDG4, and SDG7**

In the Department of Electrical and Instrumentation Engineering at Thapar Institute of Engineering and Technology, we chose to work on SDG 3: Good Health and Well-being, SDG 4: Quality Education, and SDG 7: Affordable and Clean Energy, as these goals align closely with our academic capabilities, potential ongoing projects, and availability of societal responsibilities. Each goal comprises associated targets and indicators to support action within social, economic, and environmental dimensions. These goals rely on the input of educational institutions, such as those in a technical department, that can foster these goals through research, innovation, and outreach and ultimately foster and groom people into future leaders and solutions for sustainable development.

i. **SDG 3 (Good Health and Well-being):** Good Health and Well-being is fundamental to our department's culture, especially through our work in biomedical instrumentation, automation of healthcare procedures and sensor development. Our faculty and students actively engage in research and projects that are aimed at improving diagnostic devices, remote health monitoring of individuals, and patient safety systems. We have developed devices such as ECG signal analyzers, automated sanitization systems, for remote sterilization of equipment, and wearable health sensors that showcase our commitment to health-centric technology. Through medical electronics developments, we contribute to technological innovations to make health care available in a timely manner to more people and populations.

ii. **SDG 4 (Quality Education):** Quality Education is central to our academic mission, and we strive to provide inclusive, equitable and industry-relevant

educational experiences as a technical department. As an evolving department, we implement new pedagogical practices, such as project-based learning (PBL), flipped classrooms, and collaborative research opportunities. Our faculty regularly adds materials on advancing topics, such as Internet of Things (IoT), artificial intelligence (AI) in instrumentation, and renewable energy systems. In addition, we provide outreach activities, skills-development workshops and internships, so that our students, who represent diverse social, economic and educational backgrounds, can have access to hands-on and interdisciplinary education. These efforts aim to empower learners and ensure that no one is left behind.

iii. **SDG 7 (Affordable and Clean Energy):** Affordable and Clean Energy is a strategic priority area because of the growing worldwide and national focus on sustainable and alternative energy systems. Our department is supportive of energy systems research and innovation, especially in energy-efficient and solar-based systems and smart grid proposals. Our department has conducted projects in solar microgrids, power electronics to support energy optimization, and sensor-based energy monitoring systems for clean energy. Our students are encouraged to explore energy auditing, electric vehicle integration, and hybrid power solutions, directly contributing to energy sustainability and affordability.

The Department of Electrical and Instrumentation Engineering emphasizes, as part of its comprehensive commitment to sustainable development, ongoing awareness activities around SDGs, especially SDG 3, SDG 4, and SDG 7 to raise the collective knowledge of our students, faculty and staff as to their importance and how to promote sustainable practices in their academic, professional and personal lives. The awareness interactions are done in multiple forms: informative posters, email, department stickers, all of which serve to sensitize people's cognition and special awareness as a reminder to live a more mindful way with respect to health, education and energy. To begin building a sense of sustainability and accountability into our culture and social system, awareness is a very key component of the preparation in supporting the department alignment with the global SDG agenda.

## **2. Brief Details of Activities at Department Level:**

The Department of Electrical and Instrumentation Engineering at Thapar Institute of Engineering and Technology carries on many activities relevant to the SDGs, and in

particular for SDG 3, SDG 4, and SDG 7. These activities span academic, research, and community engagement domains and are designed to promote sustainable practices, technological innovation, and social responsibility. Faculty members, students, and research scholars collaboratively participate in projects, workshops, outreach programs, and awareness campaigns that reflect the department's commitment to addressing real-world challenges. Through a multidisciplinary and inclusive approach, the department integrates sustainability into its core functioning and contributes meaningfully to the global SDG framework.

**2.1. Activities for SDG3 (Good Health and Well-being):** The Department of Electrical and Instrumentation Engineering acknowledges the importance of health, hygiene, and well-being in its ecosystem. In reference to SDG 3: Good Health and Well-being, the department carries out a variety of activities to provide a safe, clean, and health-centric environment for students, faculty, and staff. Here are the actions which have already been done in the health, hygiene, and well-being space:

**a) Regular Cleaning and Sanitation of Departmental Spaces:** Cleanliness and hygiene are critical to the prevention of communicable diseases and the overall well-being of individuals. To uphold high sanitary standards, the department has implemented a routine cleaning protocol that covers faculty cabins, departmental offices, laboratories, classrooms, and washrooms. Cleaning staff follow a scheduled maintenance plan to ensure that workspaces remain free from dust and clutter. This initiative not only supports the physical health of department occupants but also enhances the quality of the working and learning environment.

**b) Installation of RO System for Clean Drinking Water:** Access to clean and safe drinking water is a vital health factor and a component of wellness. As part of the department's infrastructure improvements and in direct support of SDG 3, a RO-enabled water purification unit will be installed on the department's premises. The purpose is to provide purified drinking water to faculty, staff, and students. Additionally, the RO system not only eliminates waterborne diseases, but it is also supportive of the department's preventive health intentions. The approval for RO systems is received from the authority, and the purchase process is initiated for the same.

The following publicity materials are shown below supporting the above SDG 3 initiative:

DEPARTMENT OF ELECTRICAL AND INSTRUMENTATION ENGINEERING   
THAPAR INSTITUTE  
OF ENGINEERING & TECHNOLOGY  
(Dedicated to the University)

**SUSTAINABLE DEVELOPMENT GOAL (SDG) 3**  
**Ensure healthy lives and promote well-being**  
**for all at all ages** 



The poster features a green background with a white silhouette of a human head in profile, facing right. Inside the head, several white daisies are growing. To the right of the head, the text "GOOD HEALTH & WELL BEING" is written in large, bold, white capital letters.

*Calm mind brings inner strength and  
self-confidence  
so that is very important for  
good health and well being*

THAPAR INSTITUTE OF ENGINEERING & TECHNOLOGY  
PATIALA, PUNJAB, INDIA

Figure 1: Visual Initiatives for SDG 3 Awareness



Figure 2: Every Drop Counts — Adopt Water-Saving Habits to Safeguard Health and Sustain Life.

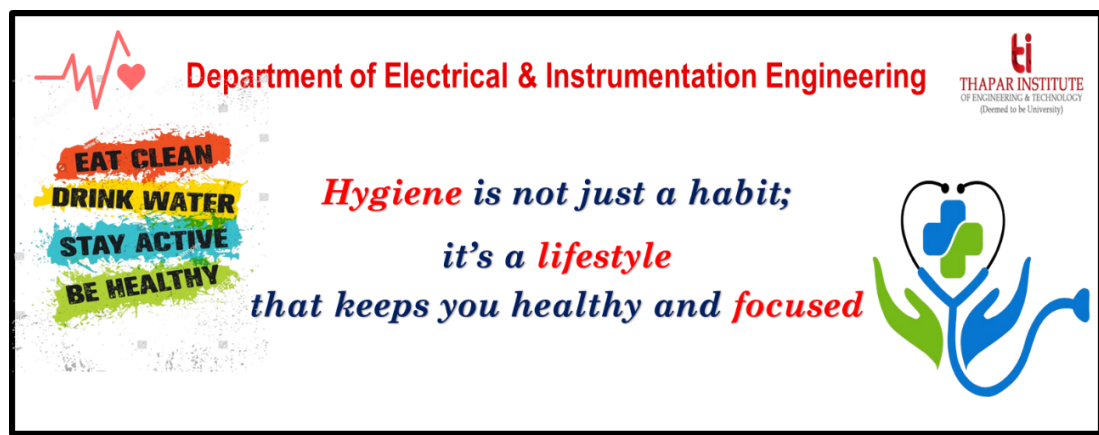


Figure 3: Healthy Habits, Healthy Life — Prioritize Hygiene and Wellness for a Focused and Active Lifestyle.

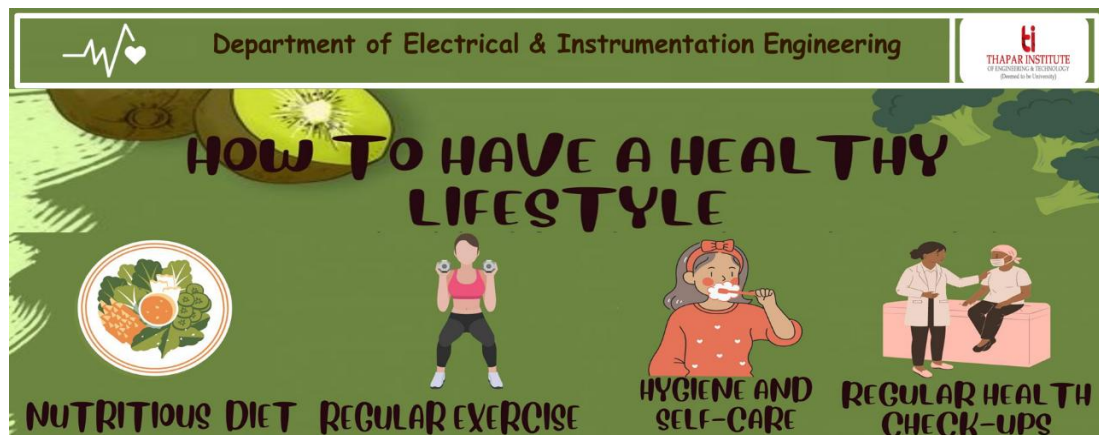


Figure 4: Live Well, Stay Well — Embrace Nutritious Food, Exercise, and Self-Care for Long-Term Health.

**2.2. Activities for SDG4 (Quality Education):** The Department of Electrical and Instrumentation Engineering is dedicated to inclusive, equitable, and quality education in alignment with SDG 4: Quality Education. Our academic ecosystem is focused on providing students with relevant abilities, critical thinking skills, and a



global perspective using a well-structured method. We focus on accessibility, excellence, and innovation in teaching methods and learning experiences.

**a) Outcome-Based Education (OBE) Framework:** All academic programs in the department have been developed and executed using Outcome-Based Education (OBE), which emphasizes a clear learning outcome and continuous quality improvement around the learning outcomes. Our B.E. Electrical Engineering (ELE) and B.E. Electronics Instrumentation and Control Engineering (EIC) programs are accredited by the NBA (National Board of Accreditation) and ABET (Accreditation Board for Engineering and Technology) - demonstrating our commitment to international standards of quality education. Other programs modelled on OBE include Electrical and Computer Engineering (EEC) and Biomedical Engineering (BME), all in keeping with the OBE, ensuring there is consistency to maintain the quality of education provided in each domain.

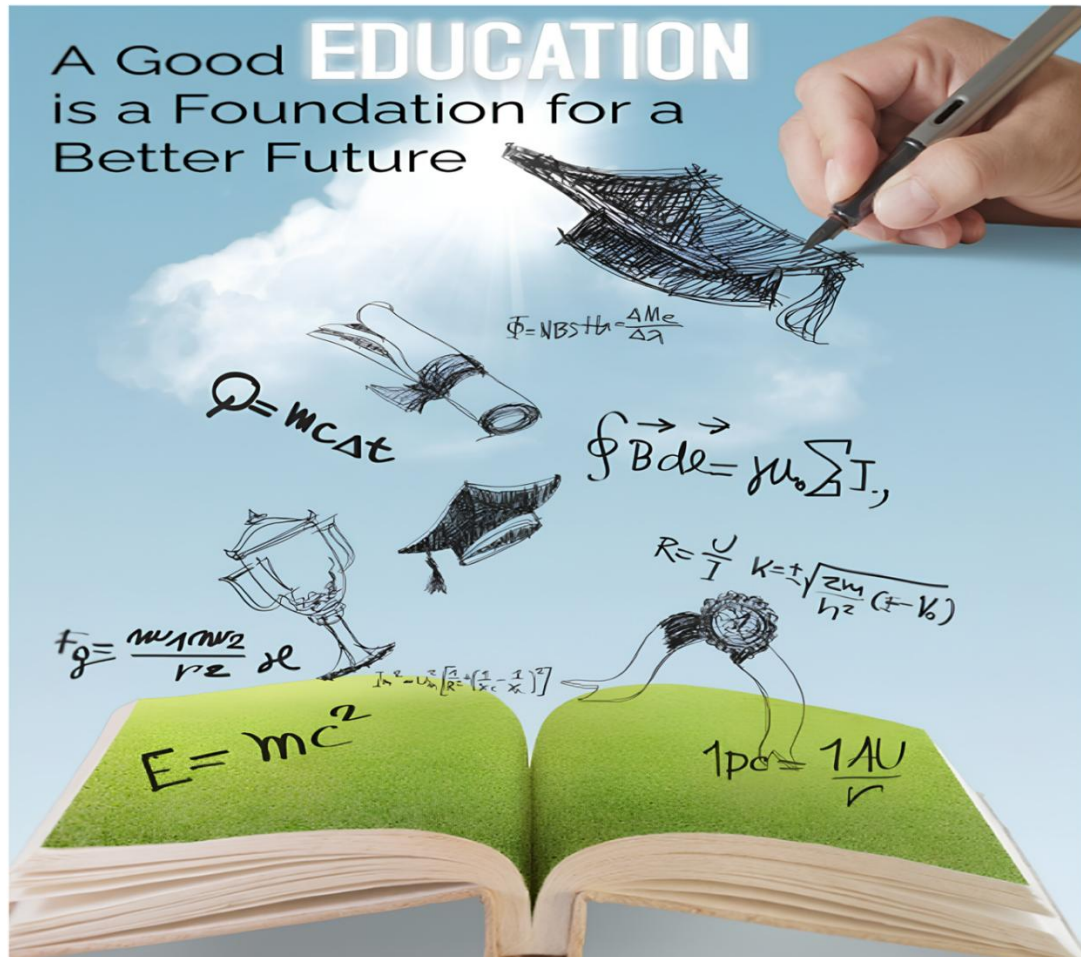
**b) SDG-Aligned Curriculum Design:** Each program's curriculum is carefully developed to address current problems and promote Sustainable Development Goals (SDG), specifically SDG 4. Courses are also evaluated periodically to reflect new technologies, sustainable products, and systemic issues that may allow students to address global or local issues. Themes and topics related to renewable energy, health-related technologies, environmental instrumentation, smart systems and ethics are incorporated into the courses to give the students awareness and think about how to engage with SDGs.

**c) Research-Driven Teaching and Experiential Learning:** Research-based teaching is a key aspect of the department's educational philosophy. Faculty members explicitly incorporate their active research into their teachings, allowing students to engage with current issues, problems, and novel solutions. The courses are designed to include theory sessions, tutorials, and laboratory components to develop conceptual understanding and active learning.

The following publicity materials are shown below, supporting the above SDG 4 initiative:

**SUSTAINABLE DEVELOPMENT GOAL (SDG) 4**

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all



**RESEARCH INTEGRATED TEACHING AIMING  
OUTCOME BASED QUALITY EDUCATION  
SUPPORTS LIFELONG LEARNING**

**THAPAR INSTITUTE OF ENGINEERING & TECHNOLOGY  
PATIALA, PUNJAB, INDIA**

Figure 5: Visual Initiatives for SDG 4 Awareness



Department of Electrical & Instrumentation Engineering


### Quality Education

Education is for improving the lives of others and for living your community and world better than you find it

**EMPOWERING STUDENTS WITH SKILLS IS  
EMPOWERING COMMUNITIES WITH SOLUTIONS**

L E A R N  
S T U D Y  
S U C C E S S  
D I S C O V E R Y  
C R E A T I V I T Y  
S T R A T E G Y  
B E G I N N I N G  
W O R K  
S C I E N C E



Department of Electrical & Instrumentation Engineering


### Quality Education

*Ensure continuous learning for continuous growth*

*Train your mind to practice what you learn*





Department of Electrical and Instrumentation Engineering




### QUALITY EDUCATION

Sufficient practice ensures good skill development and eventually financial success.



Department of Electrical & Instrumentation Engineering




### QUALITY EDUCATION

ENSURE QUALITY LEARNING AND SKILL DEVELOPMENT  
FOR A SUSTAINABLE AND EMPOWERED FUTURE

**EDUCATION**  
for Future World

**Figure 6: Quality Education — Empowering Students and Communities with Knowledge and Solutions**

**2.3. Activities for SDG7 (Affordable and Clean Energy):** To help accomplish SDG 7, the Department of Electrical and Instrumentation Engineering has taken on the role of championing the awareness, education, and innovation of sustainable energy solutions. Acknowledging that engineering is a critical catalyst in the ongoing global energy transition, the department has engaged faculty and students alike in initiatives focusing on energy efficiency, renewable energy sources, and smart energy system-based projects. The following key activities highlight the department's commitment to a sustainable energy future:

**a) Student Research and Projects on Clean Energy:** To foster innovation in clean energy, the department incorporates energy-focused research topics in its educational projects or programs, including Capstone Projects, Project Semester, and Minor/Major Research Project(s). Students can imagine and develop solutions that support affordable and clean energy technologies.

The following publicity materials are shown below supporting the above SDG 7 initiative:

**SUSTAINABLE DEVELOPMENT GOAL (SDG) 7**

Ensure access to affordable, reliable, sustainable and modern energy for all



**ENERGY SAVING REMINDER**  
*IF YOU ARE THE LAST TO LEAVE THE ROOM,  
PLEASE TURN OFF THE LIGHTS!*



SAVE Electricity



**SIMPLE STEPS TO MAKE A DIFFERENCE**



Switch off lights



Lower your AC or switch to fan for cooling



Unplug your devices!

**THAPAR INSTITUTE OF ENGINEERING & TECHNOLOGY  
PATIALA, PUNJAB, INDIA**

Figure 7: Visual Initiatives for SDG 7 Awareness





Figure 8: Simple Actions, Big Impact — Switch Off Lights and Fans to Conserve Energy for a Sustainable Future

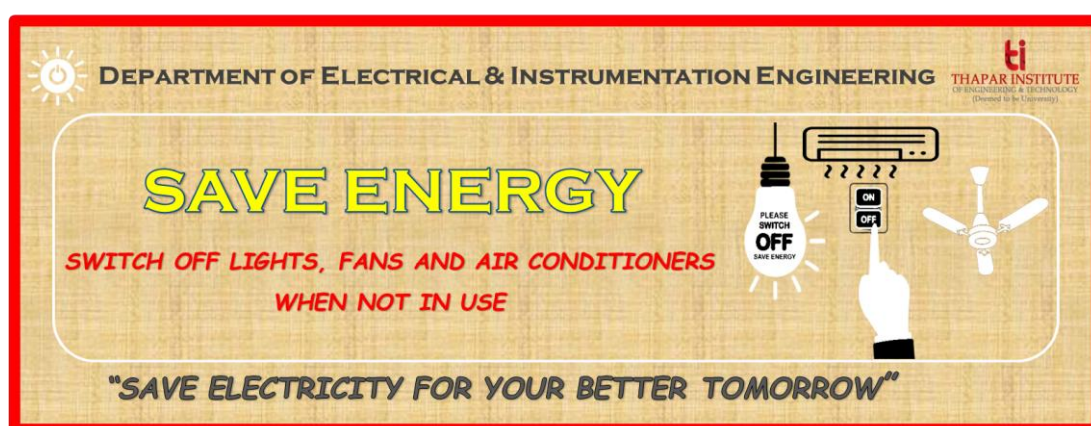


Figure 9: Conserve to Preserve — Make Energy Conservation a Habit to Ensure a Greener Tomorrow.

The above posters and stickers have been affixed in Block C, Block BC, Block CD, and Block H, and the items displayed are listed in Annexure A.

### 3. Events/Programs Conducted

Several events/ programs were conducted at the institute level by the NSS unit, coordinated by Dr. Surya Prakash and Dr. Souvik Ganguli from the Department of Electrical and Instrumentation Engineering. Details of these events are provided in Table 1.

Table 1: Departmental events aligned with relevant Sustainable Development Goals (SDGs)

| S.No | Event                       | Date      | SDG    |
|------|-----------------------------|-----------|--------|
| 1    | Har Ghar Tiranga            | 13-Aug-24 | SDG 16 |
| 2    | Nasha Mukta Bharat Abhiyaan | 14-Aug-24 | SDG 3  |

|    |                                                                     |           |        |
|----|---------------------------------------------------------------------|-----------|--------|
| 3  | Save Electricity Campaign                                           | 07-Sep-24 | SDG 7  |
| 4  | Cybercrime Awareness Program                                        | 18-Sep-24 | SDG 4  |
| 5  | Swachhta Hi Sewa Campaign                                           | 21-Sep-24 | SDG 3  |
| 6  | Swachhta Hi Sewa Campaign                                           | 28-Sep-24 | SDG 3  |
| 7  | Daan Utsav                                                          | 07-Oct-24 | SDG 1  |
| 8  | Daan Utsav                                                          | 08-Oct-24 | SDG 1  |
| 9  | Blood Donation Camp (As a Part of Daan Utsav)                       | 16-Oct-24 | SDG 3  |
| 10 | Prakriti Parikshan                                                  | 06-Dec-24 | SDG 13 |
| 11 | Vidya: Stem For Social Goodwill and Its Impact on Society (Part-I)  | 08-Feb-25 | SDG 4  |
| 12 | Vidya: Stem For Social Goodwill and Its Impact on Society (Part-II) | 13-Feb-25 | SDG 4  |
| 13 | Cleanliness Drive                                                   | 24-Mar-25 | SDG 3  |
| 14 | Drawing Competition                                                 | 25-Mar-25 | SDG 4  |
| 15 | Menstrual Hygiene Workshop                                          | 26-Mar-25 | SDG 3  |
| 16 | Need Of Soft Skills in Engineering and Business Education           | 27-Mar-25 | SDG 4  |
| 17 | Serving Smile; Spreading Wellness                                   | 28-Mar-25 | SDG 3  |
| 18 | Yoga For Healthy Heart                                              | 29-Mar-25 | SDG 3  |
| 19 | Plant A Tree and Plant Hope for Future                              | 30-Mar-25 | SDG 13 |

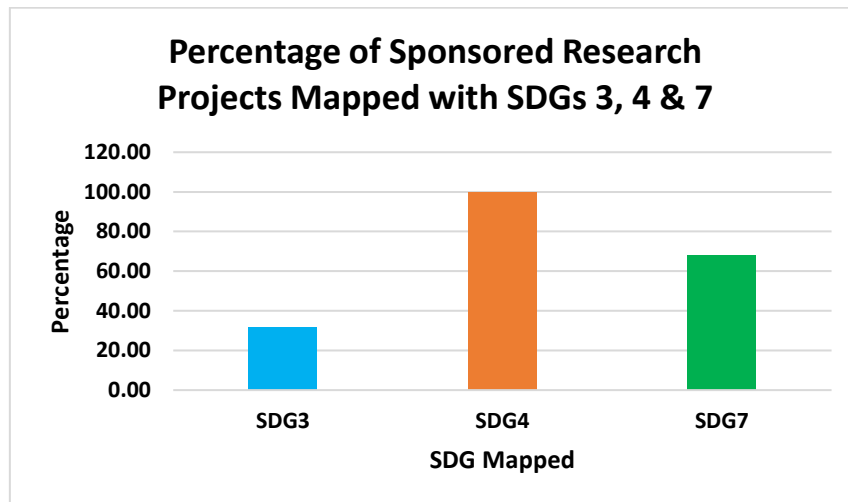
## 4. SDG Mapping with Departmental Research Initiatives

### 4.1. SDG Mapping corresponding to ELC Activities

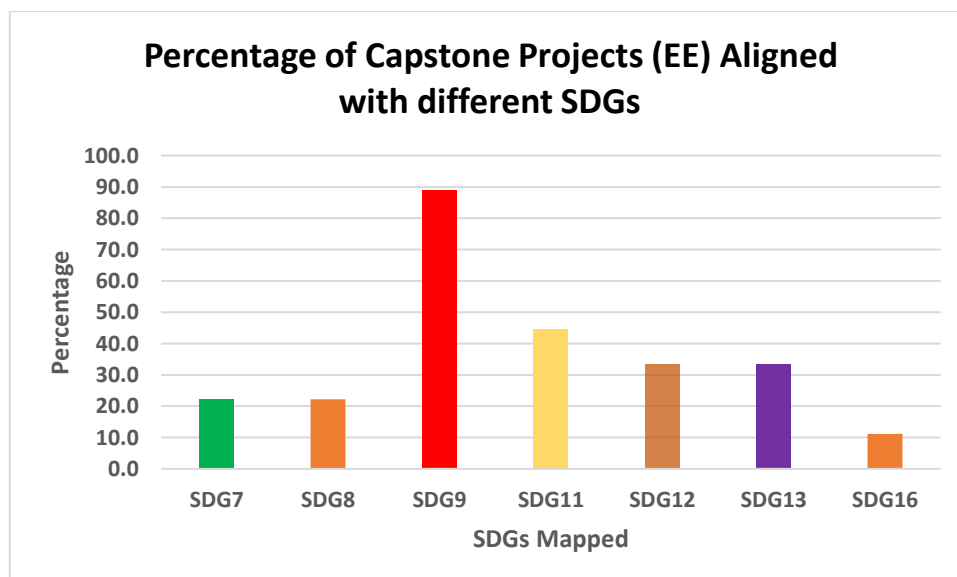
| Program                       | Semester | Activity                                                      | SDG Mapping      |
|-------------------------------|----------|---------------------------------------------------------------|------------------|
| <b>Electrical Engineering</b> | First    | Arduino based Embedded system                                 | SDG3, SDG4       |
|                               | Second   | IoT based home automation                                     | SDG3, SDG4       |
|                               | Third    | DC motor rewinding and Testing of performance Characteristics | SDG3, SDG4, SDG7 |
|                               | Fourth   | Robotic ARM Control                                           | SDG3, SDG4       |
|                               | Fifth    | Design of switch mode power amplifier                         | SDG3, SDG4, SDG7 |
| <b>Biomedical Engineering</b> | First    | Arduino based Embedded system                                 | SDG3, SDG4       |
|                               | Second   | IoT based home automation                                     | SDG3, SDG4       |
|                               | Third    | Development of Electromyogram (EMG) system using the Arduino  | SDG3, SDG4       |

|                                              |        |                                                                                            |                  |
|----------------------------------------------|--------|--------------------------------------------------------------------------------------------|------------------|
| <b>Electronics &amp; Instrumentation</b>     | Fourth | Robotic ARM Control                                                                        | SDG3, SDG4       |
|                                              | Fifth  | Brain Tumour Segmentation using UNET                                                       | SDG3, SDG4       |
|                                              | First  | Arduino based Embedded system                                                              | SDG3, SDG4       |
|                                              | Second | IoT based home automation                                                                  | SDG3, SDG4       |
|                                              | Third  | Smart Security System                                                                      | SDG3, SDG4       |
|                                              | Fourth | Robotic ARM Control                                                                        | SDG3, SDG4       |
|                                              | Fifth  | Design and implementation of signal conditioning and data acquisition system for a process | SDG3, SDG4       |
|                                              | First  | Arduino based Embedded system                                                              | SDG3, SDG4       |
|                                              | Second | IoT based home automation                                                                  | SDG3, SDG4       |
|                                              | Third  | Gaming and Animation (3D modelling and Virtual reality)                                    | SDG3, SDG4       |
| <b>Electrical &amp; Computer Engineering</b> | Fourth | Robotic ARM Control                                                                        | SDG3, SDG4       |
|                                              | Fifth  | Design of switch mode power amplifier                                                      | SDG3, SDG4, SDG7 |

#### 4.2. SDG Mapping corresponding to Sponsored Research Projects

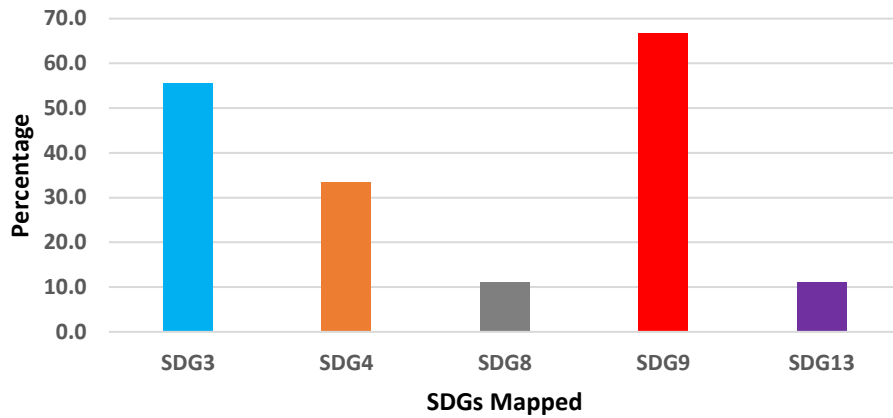


#### 4.3. SDG Mapping corresponding to Capstone Projects

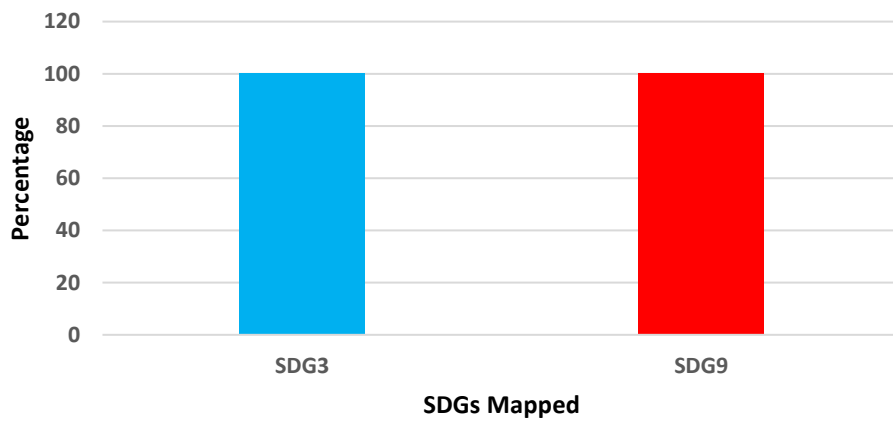




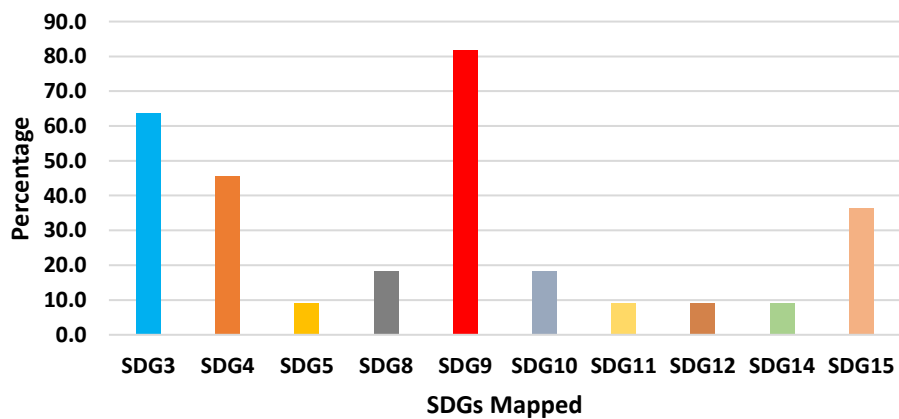
**Percentage of Capstone Projects (EIC) Aligned with different SDGs**



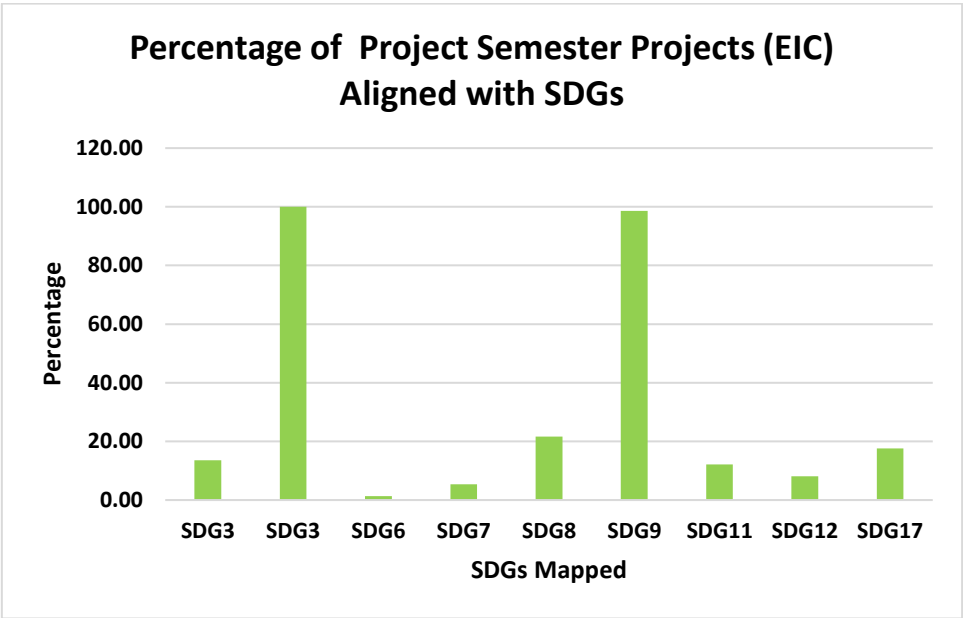
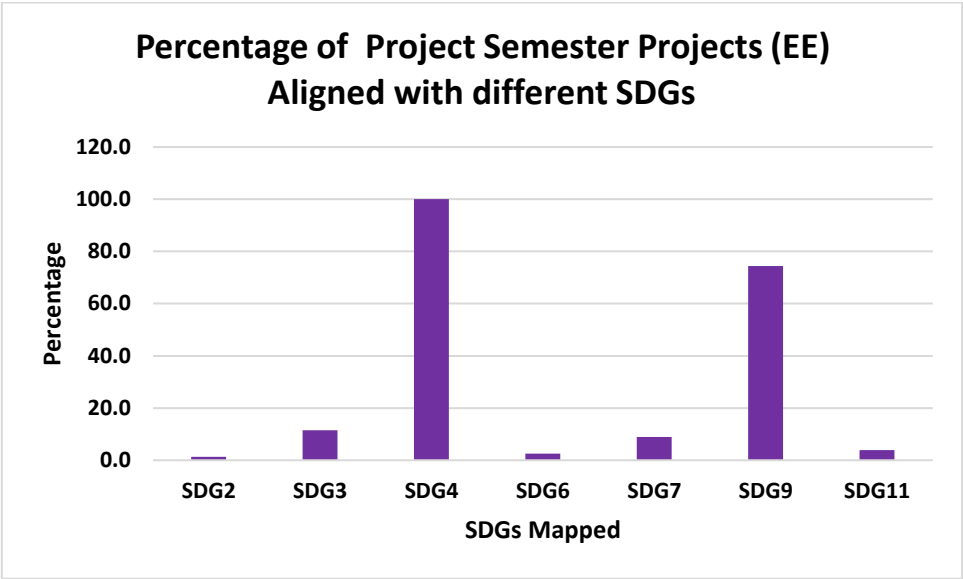
**Percentage of Capstone Projects (BME) Aligned with different SDGs**



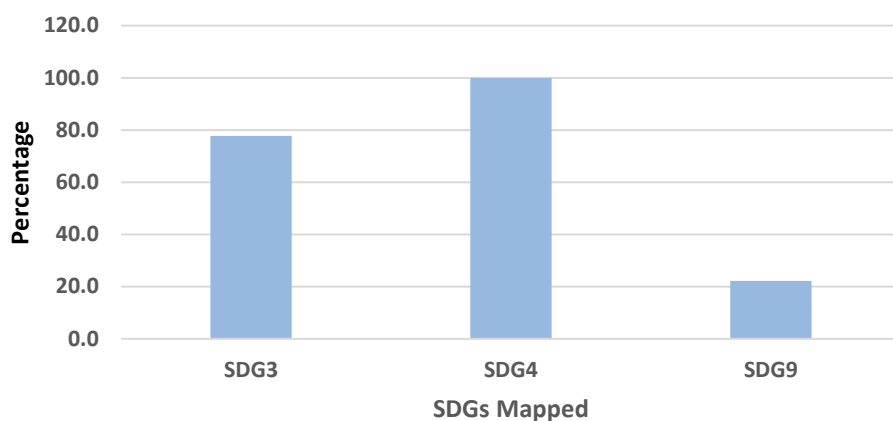
**Percentage of Capstone Projects (EEC) Aligned with different SDGs**



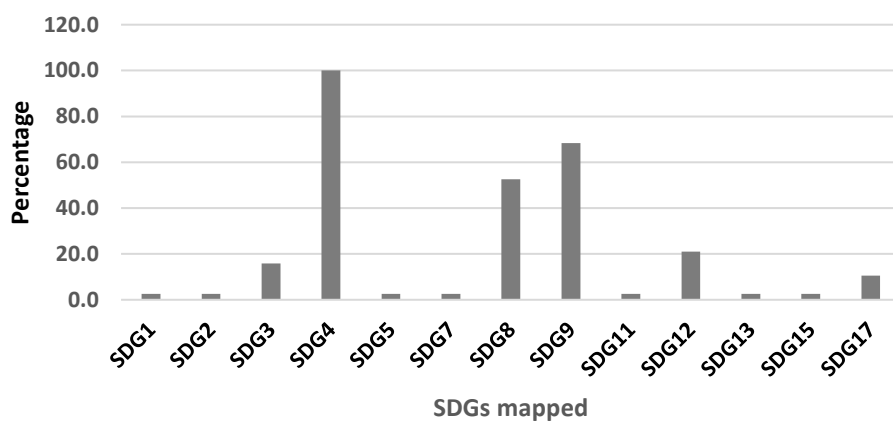
4.4. SDG Mapping corresponding to Project Semester Projects



**Percentage of Project Semester Projects (BME)  
Aligned with different SDGs**



**Percentage of Project Semester Projects (EEC)  
Aligned with different SDGs**



## Annexure-A

**Display Items (Posters and Stickers) affixed at Different Locations in Department of Electrical and Instrumentation Engineering.**



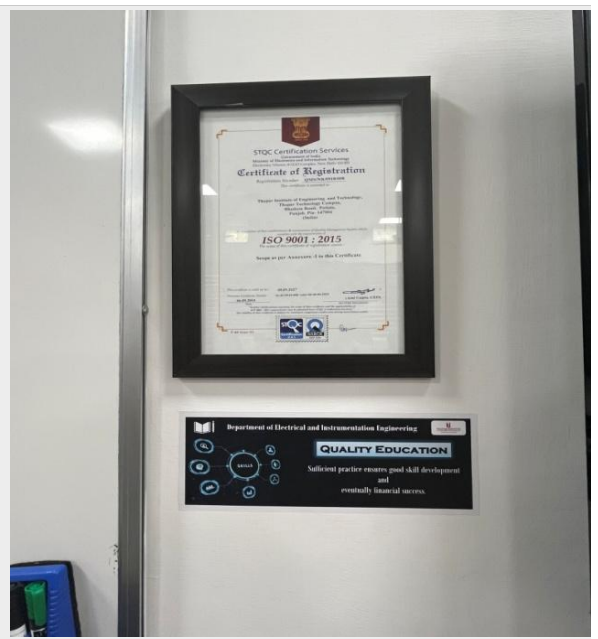
**Outside Department Library (C103) C-Block,  
Ground Floor**



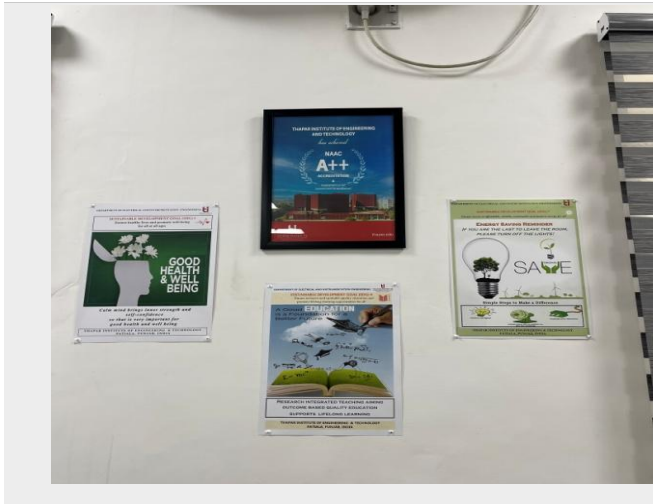
**Outside Department Office (C110) C-Block, Ground Floor**



## Outside Department Office (C110) C-Block, Ground Floor



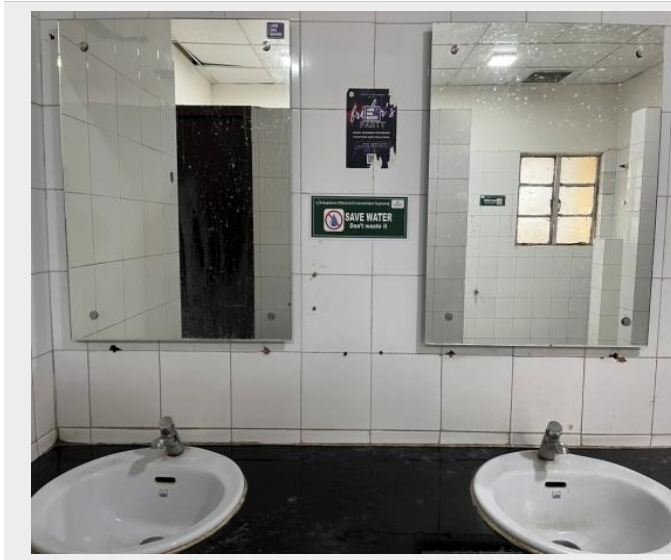
### Inside (C104) C-Block, Ground Floor



**Inside (C104) C-Block, Ground Floor**



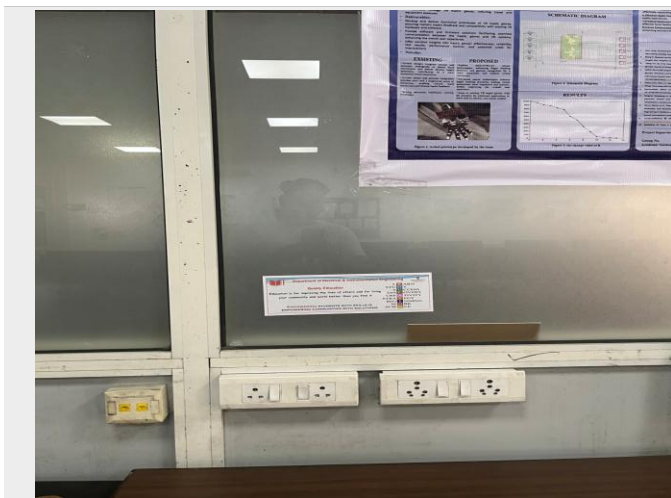
**Inside (C104) C-Block, Ground Floor**



**Boys Washroom, C-Block, Ground Floor**



**Boys Washroom, C-Block, Ground Floor**



**H block**

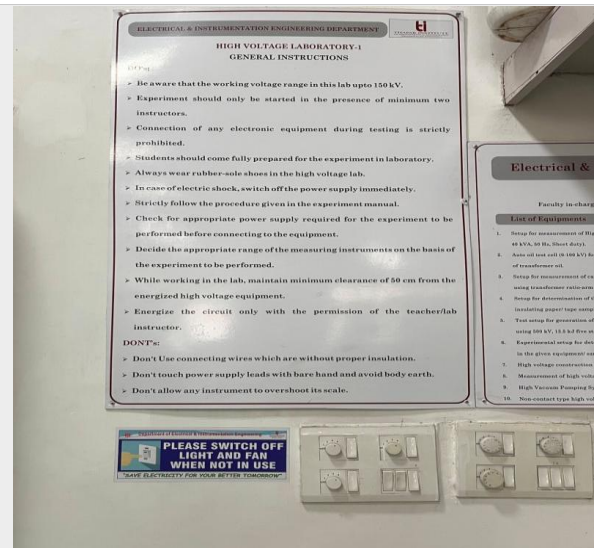


**Gents Washroom, BC-Block, Ground**





Inside Department Library (C103)



Inside High Voltage Lab (C102)



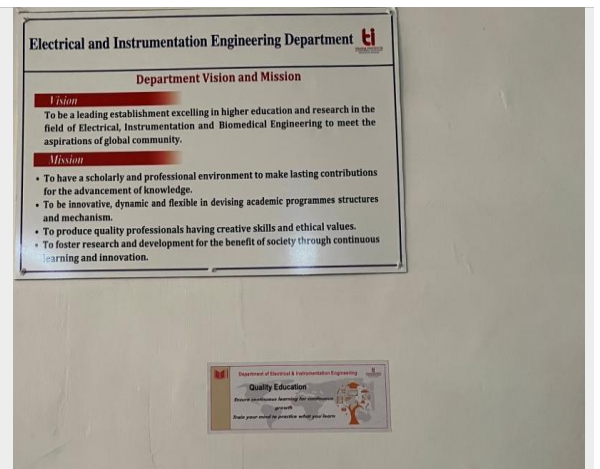
Stairs BC Block & C-Block, Ground Floor



Inside PSP Lab (CD101), CD Block Ground Floor



Corridor CD Block, Ground Floor



Inside INC LAB (C217), C Block, 1<sup>st</sup> Floor



**Corridor, B-Block, 1st Floor**



**Inside Dept. Office C-110, C Block, Ground Floor**



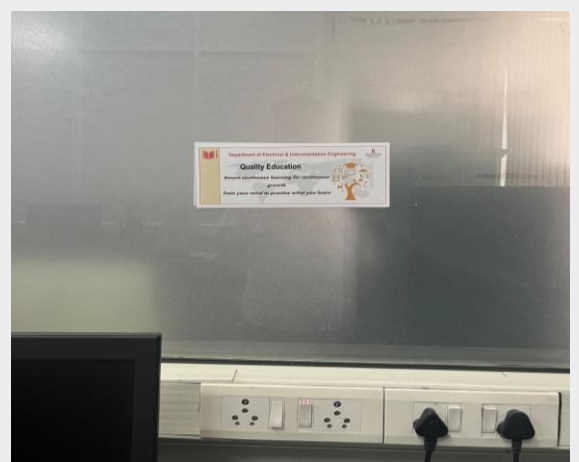
**Inside Dept. Library C103, C Block, Ground Floor**



**Inside Dept. Library C103, C Block, Ground Floor**



**H Block**



**H Block**



**H Block**



**H Block Boys Washroom**