



ANNA SAHEB DANGE

COLLEGE OF ENGINEERING AND TECHNOLOGY, ASHTA

(An Empowered Autonomous Institute affiliated
to Shivaji University Kolhapur)

BOOKLET ON

INTEGRATION OF

SUSTAINABLE

DEVELOPMENT

IN ENGINEERING AND PROFESSIONAL EDUCATION

Our Journey | Our Learning | Our Commitments



ACADEMIC
INTEGRATION



CAPACITY
DEVELOPMENT



INNOVATION
AND PROJECTS



COMMUNITY
ENGAGEMENT



SUSTAINABLE
CAMPUS PRACTICES



CULTURE
AND DIALOGUE

Educate ■ Engage ■ Empower ■ Sustain
Engineering a Better Tomorrow for All



RESPONSIBLE
EDUCATION



INCLUSIVE
DEVELOPMENT



INNOVATIVE
SOLUTIONS



SUSTAINABLE
FUTURE

Published by: Office of Institutional Performance and Quality Assurance (IPQA), ADCET, Ashta



SUSTAINABLE DEVELOPMENT GOALS



"Integrating Sustainable Development into Academic Practices at ADCET"

Message from the Director

It gives me immense pleasure to present this institutional booklet titled **"Integrating Sustainable Development into Academic Practices at ADCET"**, which reflects our institute's progressive commitment towards quality education, responsible engineering, innovation, and sustainable development.

At Annasaheb Dange College of Engineering and Technology (ADCET), Ashta, we firmly believe that higher education should not only impart technical knowledge but also nurture socially responsible professionals capable of addressing the complex environmental, technological and societal challenges of our times. Sustainable Development Goals (SDGs) provide an internationally accepted framework that enables institutions to connect education with real-world developmental priorities.

Over the years, ADCET has progressively strengthened sustainability perspectives through curriculum enrichment, faculty and student capacity development, research, innovation, community engagement, and responsible campus practices. Rather than treating sustainability as an isolated initiative, the institute has adopted a systematic approach that integrates sustainable development into its academic ecosystem while respecting the unique context of each discipline.

This booklet captures our institutional journey—from initial awareness and academic visibility to policy development, structured faculty capacity building, challenge-driven student learning, community engagement, and continuous institutional improvement. It reflects our collective efforts towards creating graduates who possess not only strong technical competence but also the knowledge, values and professional responsibility required to contribute meaningfully to sustainable development.

I congratulate the Dean (Academics), IQAC, all Deans, Heads of Departments, faculty members and staff whose sincere efforts have contributed to the preparation of this comprehensive institutional document. I am confident that this booklet will serve as an important reference for our stakeholders and further strengthen ADCET's commitment towards excellence in engineering education and sustainable development.

Dr. L. Y. Waghmode
Director, ADCET

FROM THE DESK OF THE DEAN (ACADEMICS)

Sustainable Development has emerged as one of the defining priorities of higher education worldwide. Engineering institutions are expected not only to produce competent graduates but also professionals capable of designing solutions that are environmentally responsible, socially responsive and economically sustainable.

At ADCET, sustainability integration has been viewed as an evolving academic journey rather than a one-time initiative. The institute has progressively moved from creating awareness of the Sustainable Development Goals (SDGs) to developing a structured institutional framework that promotes sustainability-oriented curriculum enrichment, faculty development, student learning, research, innovation and community engagement.

This booklet has been consciously designed to present that journey in a systematic manner. It demonstrates how institutional policy, faculty capacity-building, academic practices, student projects, innovation activities, outreach initiatives and sustainable campus practices collectively contribute towards achieving the broader objectives of sustainable development. The document also reflects our emphasis on Outcome-Based Education, experiential learning, interdisciplinary thinking and continuous improvement.

I sincerely appreciate the valuable contributions of all Heads of Departments, faculty coordinators and institutional committees involved in documenting these initiatives. I hope this booklet serves as a practical institutional reference for strengthening Education for Sustainable Development (ESD) and inspires continued innovation in engineering education.

Dr. S. Gopinath
Dean (Academics)

Publication Information:

**Title of the Publication: Integrating Sustainable Development into Academic Practices
ADCET's Progressive Journey towards Sustainable Development Goals (SDGs)**

Published by:

Annasaheb Dange College of Engineering and Technology (ADCET), Ashta
(An Empowered Autonomous Institute)
Tal. Walwa, Dist. Sangli – 416301, Maharashtra, India

Prepared Under the Guidance of:

Dr. L. Y. Waghmode
Director

Dr. S. Gopinath
Dean (Academics)

Prepared by:

Dr. Manoj H. Mota
Professor & Head, Department of Civil Engineering

Published by:

Internal Quality Assurance Cell (IQAC)
Annasaheb Dange College of Engineering and Technology, Ashta

Contents

Part I – Institutional Context and Evolution

1. Preamble
2. About the Booklet: Purpose and Scope
3. ADCET's Progressive Journey towards SDG Integration

Part II – Institutional Direction and Academic Capacity

4. Institutional Policy for Sustainable Development
5. Faculty Capacity Development for Sustainable Development
6. SDG CONNECT: Institute-Wide Faculty Capacity Building
7. ADCET EESD Faculty Toolkit

Part III – Student Capacity, Learning and Innovation

8. Student Capacity Development for Sustainable Development
9. Student Projects for Sustainable Development
10. Challenge-Driven Student Innovation — SDG Hackathon

Part IV – Societal Engagement and Responsible Campus

11. Community Engagement for Sustainable Development
12. Sustainable Campus Practices

Part V – Institutional Culture, Integration and Way Forward

13. Building a Culture of Sustainable Development — Dnyanada
14. ADCET Framework for Progressive Integration of Sustainable Development
15. Progress, Emerging Outcomes and Institutional Learning
16. Way Forward
17. Concluding Note

Part I –

Institutional Context and Evolution

- 1. Preamble**
- 2. About the Booklet: Purpose and Scope**
- 3. ADCET's Progressive Journey towards SDG Integration**

1. PREAMBLE:

Sustainable development is no longer a concern confined to environmental protection or resource conservation; it represents a broader responsibility to pursue development that is **environmentally responsible, socially responsive and economically meaningful**. Contemporary challenges related to climate change, water and energy security, pollution, resource depletion, food systems, public health, urbanisation, technological transformation and social well-being increasingly demand integrated knowledge, responsible decision-making and context-sensitive solutions.

Higher education institutions have a significant role in responding to these challenges. Beyond imparting disciplinary knowledge, education must enable learners to **understand complex societal and environmental concerns, examine the wider implications of professional decisions, and apply knowledge and technology responsibly**. Engineering and professional education, in particular, can contribute by developing competencies for problem identification, innovation, systems thinking, efficient resource utilisation and the design of solutions that respond to present needs while remaining conscious of their long-term consequences.

The **United Nations Sustainable Development Goals (SDGs)** provide a globally recognised framework for understanding interconnected development challenges and directing collective efforts towards a more inclusive, resilient and sustainable future. Within an educational institution, however, meaningful engagement with the SDGs extends beyond awareness of the 17 Goals or their symbolic representation. It requires the ability to **contextualise sustainability within different disciplines, understand relevant challenges and targets, connect learning with real-world concerns, and progressively translate understanding into responsible academic and professional action**.

At **Annasaheb Dange College of Engineering and Technology (ADCET), Ashta**, the engagement with sustainable development has evolved progressively through academic awareness, curricular exposure, faculty and student capacity development, sustainability-oriented projects and innovation, community engagement and responsible campus practices. As this engagement expanded across academic programs and institutional units, the need for a **common understanding, greater uniformity in sustainability contextualisation and a structured institutional direction** became increasingly evident.

ADCET therefore views sustainability integration as an **evolving educational and institutional process**. The approach is founded on the understanding that different disciplines contribute to sustainable development in different ways and that meaningful integration should emerge from **authentic disciplinary contexts, relevant sustainability challenges and identifiable opportunities for learning, innovation and responsible intervention**. The intent is not to associate every academic activity with multiple SDGs, but to encourage a deeper understanding of where education, engineering, technology and professional practice can make a meaningful contribution.

This institutional journey has progressively moved from **SDG awareness and academic visibility towards curricular engagement, common understanding, policy direction, faculty capacity development and structured academic integration**. The development of the **Institutional Policy for Sustainable Development**, capacity-building of faculty members, introduction of a target-oriented approach to SDG contextualisation, and development of the **ADCET Education for Engineering and Sustainable Development (EESD) Faculty Toolkit** represent important steps in strengthening this journey.

The present booklet captures this evolving institutional engagement with sustainable development. It brings together selected academic initiatives, capacity-development efforts, student projects and innovation, community engagement, campus practices and institutional mechanisms that demonstrate ADCET's progressive approach towards understanding and integrating sustainable development across its educational ecosystem.

Through this endeavour, ADCET seeks to strengthen an educational environment where **awareness leads to understanding, understanding develops competency, competency enables innovation, and innovation is guided by responsibility towards society and the environment**.

Awareness → Understanding → Competency → Innovation → Responsible Action → Sustainable Development

The journey is progressive, and the institutional commitment is to continuously learn, contextualise, implement and improve.

2. ABOUT THE BOOKLET: PURPOSE AND SCOPE

This booklet presents the **progressive institutional engagement of Annasaheb Dange College of Engineering and Technology (ADCET), Ashta, with Sustainable Development and the Sustainable Development Goals (SDGs)**. It has been developed to bring together the institution's evolving academic approach, capacity-building efforts, student learning and innovation, community engagement, responsible campus practices and institutional mechanisms related to sustainable development within a common and coherent framework.

The purpose of the booklet is **not merely to compile activities associated with individual SDGs or to present a numerical mapping of institutional practices against the 17 Goals**. Rather, it seeks to document how ADCET has progressively moved from **SDG awareness and academic visibility towards deeper understanding, disciplinary contextualisation, institutional direction and structured integration of sustainability perspectives within its educational ecosystem**.

The booklet provides a consolidated perspective on the institution's efforts to:

- establish a common institutional direction for sustainable development;
- strengthen faculty and student understanding of sustainability and the SDG framework;
- progressively integrate sustainability perspectives into relevant curricular and teaching–learning contexts;
- promote experiential and immersive learning through sustainability-oriented academic activities;
- encourage students to engage with environmental, societal, technological and resource-related challenges through projects and innovation;
- strengthen challenge-driven and context-sensitive approaches to student problem-solving;
- extend academic and disciplinary knowledge to community and societal contexts;
- adopt responsible campus practices related to energy, water, resources, waste and environmental stewardship; and
- develop a more structured, target-oriented and evidence-conscious approach to understanding and documenting sustainability-related contributions.

The scope of the booklet extends across the **academic, innovation, community and institutional dimensions of sustainable development at ADCET**. It includes the evolution of the institutional approach towards SDG integration; the Institutional Policy for Sustainable Development; faculty and student capacity development; curriculum and teaching–learning perspectives; the institute-wide **SDG CONNECT** faculty capacity-building initiative; the **ADCET Education for Engineering and Sustainable Development (EESD) Faculty Toolkit**; student projects and challenge-driven

innovation; community and outreach initiatives; sustainable campus practices; and efforts to strengthen sustainability as a part of institutional academic and cultural discourse.

The practices and initiatives presented in this booklet have evolved at **different stages of ADCET's institutional journey**. Several academic, outreach and campus practices existed prior to the development of the present policy and structured sustainability integration methodology. These practices are included where they demonstrate meaningful relevance to sustainable development and provide evidence of the institution's broader engagement with environmental, societal, technological and developmental concerns.

Accordingly, the booklet **does not retrospectively present all earlier sustainability-relevant activities as outcomes of the recently developed institutional framework**. Instead, it recognises them as part of the institutional experience that has progressively contributed to greater awareness, understanding and academic engagement with sustainable development. The subsequent development of a common policy direction, faculty capacity-building initiative and structured academic methodology represents the **progressive strengthening of this institutional approach**.

The selected examples included in the booklet are intended to demonstrate the **breadth, diversity and evolving nature of sustainability engagement across ADCET**. They do not constitute an exhaustive record of every course, project, activity or campus practice having potential relevance to the SDGs. Detailed reports, participation records, course documents, project records, audit reports, certificates and other supporting documents are maintained as **underlying institutional evidence**, wherever applicable.

Through this booklet, ADCET seeks to present a transparent and coherent account of its journey towards sustainable development—highlighting **the progress achieved, the institutional learning emerging from implementation, and the direction in which the institute intends to progressively strengthen sustainability integration**.

The booklet therefore presents not merely a record of activities, but an evolving institutional journey from awareness and visibility towards understanding, capacity, integration and responsible action.

3. ADCET'S PROGRESSIVE JOURNEY TOWARDS SDG INTEGRATION

ADCET's engagement with Sustainable Development and the Sustainable Development Goals (SDGs) has evolved progressively through **awareness, academic visibility, curricular engagement, initial application, common understanding, institutional direction and structured academic integration**. The present approach has emerged through institutional experience and a gradual strengthening of sustainability perspectives within academic and related institutional practices.

The journey did not begin with a formal policy or a single institutional initiative. It began with the recognition that engineering and professional education must increasingly enable students and faculty members to understand the wider environmental, societal and developmental implications of disciplinary knowledge and technological decisions.

Over successive academic stages, ADCET has progressively strengthened its approach—from creating basic visibility of the SDGs within academic processes to developing a common institutional direction and an academic methodology for sustainability integration.

The institutional evolution may be understood through the following five progressive phases.

Phase I – Awareness and Academic Visibility:

Creating Initial Familiarity with the Sustainable Development Goals

The initial stage of ADCET's engagement focused on **creating awareness and visibility of the Sustainable Development Goals within the academic environment**.

As a first step, the list of the **17 United Nations Sustainable Development Goals** was introduced as a component of academic course documentation maintained by faculty members. The purpose of this initiative was to provide regular visibility of the SDG framework and encourage faculty members to reflect on the possible relationship between their disciplinary courses, academic activities and broader sustainability concerns.

At this stage, the institutional emphasis was primarily on **faculty sensitisation and academic awareness**. The inclusion of the SDGs in course documentation was not considered evidence of formal course-level sustainability integration. Rather, it served as an initial academic stimulus for faculty members to recognise that sustainability concerns extend across diverse engineering and professional disciplines.

This phase established an important starting point:

Making the SDGs visible within academic processes and initiating faculty reflection on disciplinary relevance.

Institutional progression:

Awareness → Visibility → Initial Academic Reflection

Phase II – Curricular and Academic Engagement

Moving from Visibility towards Formal Student Exposure and Initial Academic Application

The next stage involved strengthening students' formal curricular exposure to sustainable development.

During the curriculum revision process, the Sustainable Development Goals were explicitly introduced within the course **Environmental Studies**. As Environmental Studies is a **mandatory course for students across the academic programs of ADCET**, the course provided a common curricular platform for developing awareness of environmental concerns, sustainability and the broader global framework of the SDGs.

In the subsequent curriculum revision, the sustainability-related content within the curricular framework was further strengthened, reflecting the institute's growing academic emphasis on sustainable development and the need to provide students with a broader understanding of contemporary environmental and developmental challenges.

Parallel to this curricular development, selected academic programs progressively began identifying the sustainability relevance of **academic activities, experiential learning practices and final-year capstone projects**. Faculty members and departments started mapping selected academic interventions and student projects with relevant SDGs, primarily based on the broad statements and thematic focus of the 17 Goals.

This initial mapping served an important academic purpose. It encouraged faculty members and students to examine engineering problems and academic activities beyond their immediate technical outcomes and recognise possible connections with challenges related to **water, energy, pollution, infrastructure, agriculture, health, resource utilisation, waste management and societal well-being**.

Thus, the institutional engagement progressively moved from SDG visibility towards **curricular exposure and initial academic application**.

The SDGs gradually moved from being visible in academic documentation to becoming a point of reference in curriculum, academic activities and student projects.

Institutional progression:

Visibility → Curricular Exposure → Initial Academic Engagement

Phase III – Common Understanding and Alignment

Strengthening Uniformity and Developing a Deeper Understanding of SDG Mapping

As academic engagement with SDG mapping progressively increased across programs, ADCET recognised the need for **greater uniformity in interpretation and a deeper common understanding of the SDG framework**.

The initial approach, based primarily on the broad statements of the 17 Sustainable Development Goals, had provided a useful starting point for recognizing sustainability relevance. With growing faculty and departmental engagement, however, the institutional discussion naturally progressed towards a more detailed understanding of the relationship between **SDGs, specific targets and official indicators**.

The institute recognized that different academic disciplines address sustainability through different technological, environmental, social and professional contexts. Therefore, a common approach was required that could improve **uniformity in understanding and contextualization without restricting disciplinary flexibility**.

Phase IV – Institutionalization and Structured Academic Integration

Moving from Common Understanding to a Unified Institutional Framework

The insights gained during the earlier phases highlighted the need for a more consistent and institution-wide approach to integrating sustainable development into academic practices. While individual departments had begun exploring sustainability through curriculum, projects and academic activities, the institute recognized that long-term implementation required a common institutional direction supported by shared understanding, faculty capacity and structured documentation.

To address this need, ADCET adopted a series of coordinated institutional initiatives. An **Institutional Policy for Sustainable Development** was formulated to establish the institute's vision and guiding principles for sustainability integration. This was followed by the institute-wide faculty development programme **SDG CONNECT**, which enabled faculty members to develop a common understanding of the SDG framework, targets and indicators, and their relevance to engineering and professional education.

Building on this foundation, the **ADCET EESD Faculty Toolkit** was developed to provide a practical methodology for integrating sustainability into curriculum design, learning activities, assessment and student projects. The toolkit encouraged faculty members to begin with the sustainability challenge being addressed, identify the relevant SDG and target, design appropriate academic interventions and document meaningful evidence of student learning.

Through these initiatives, ADCET progressively moved from isolated academic efforts to a coordinated institutional framework that promotes consistent, evidence-based and discipline-sensitive integration of sustainable development across teaching, research, innovation, community engagement and campus practices. The framework continues to evolve through periodic review, institutional learning and continuous improvement.

Institutional Progression:

Common Understanding → Institutional Policy → Faculty Capacity Building → Structured Academic Integration → Continuous Improvement

Part II –

Institutional Direction and Academic Capacity

- 4. Institutional Policy for Sustainable Development**
- 5. Faculty Capacity Development for Sustainable Development**
- 6. SDG CONNECT: Institute-Wide Faculty Capacity Building**
- 7. ADCET EESD Faculty Toolkit**

4. INSTITUTIONAL POLICY FOR SUSTAINABLE DEVELOPMENT:

From Evolving Academic Engagement to a Common Institutional Direction

As ADCET's engagement with Sustainable Development and the Sustainable Development Goals progressively expanded across academic programs and institutional activities, the need for a **common institutional direction** became increasingly important.

The initial stages of SDG awareness, curricular exposure and academic mapping encouraged faculty members and students to recognise the sustainability relevance of courses, learning activities and student projects. With growing engagement across diverse disciplines, the institute recognised that sustainability could not be viewed as the responsibility of a single department, course or institutional unit.

Engineering and professional disciplines engage with sustainability through different contexts. Water, infrastructure and environmental quality may be central to one discipline; energy efficiency and power systems to another; manufacturing, resource productivity and thermal systems to another; while digital technologies, artificial intelligence, food systems, management, scientific understanding and human behaviour offer their own distinct opportunities for contributing to sustainable development.

ADCET therefore identified the need for an institutional framework that could provide **a shared direction while retaining disciplinary flexibility**.

The policy was conceived not as a mechanism for imposing identical sustainability activities across all academic programs, but as an **enabling institutional framework** to encourage relevant academic and institutional units to identify meaningful opportunities for integrating sustainability within their respective contexts.

This led to the development and approval of the **Institutional Policy for Sustainable Development at ADCET**.

4.1 Purpose of the Institutional Policy

The Institutional Policy for Sustainable Development provides a common direction for progressively strengthening sustainability considerations across the academic and institutional ecosystem of ADCET.

The policy seeks to enable the institute to:

- strengthen understanding of sustainable development across academic and institutional domains;
- encourage meaningful integration of sustainability perspectives within relevant curriculum and teaching–learning contexts;
- promote student projects, innovation and problem-solving connected with contemporary environmental and societal challenges;
- support faculty and student capacity development in sustainability-related areas;
- encourage research, collaboration and knowledge engagement relevant to sustainable development;
- strengthen community engagement through discipline-relevant and socially responsive interventions; and
- promote responsible campus practices related to energy, water, resources, waste and environmental stewardship.

The policy recognises that **the nature and extent of sustainability integration may vary across disciplines**. It therefore provides an institutional direction without prescribing a uniform set of activities for every academic program.

The underlying approach is to encourage **relevance, feasibility, disciplinary contextualisation and progressive implementation**.

4.2 Policy Philosophy

The policy is founded on the understanding that higher education institutions can contribute to sustainable development through the interconnected domains of:



Within this perspective, ADCET views sustainable development as a **shared institutional responsibility** requiring participation from academic programs, faculty members, students and relevant institutional units.

The policy does not seek to maximise the number of activities labelled or mapped under the SDGs. Instead, it provides a framework for progressively strengthening **sustainability understanding, relevant academic integration, responsible action and evidence of institutional engagement**.

The policy provides a common institutional direction while allowing sustainability engagement to emerge from authentic disciplinary and functional contexts.

4.3 INSTITUTIONAL POLICY FOR SUSTAINABLE DEVELOPMENT:

Attached as **Annexure: A**

4.4 Key Domains of Institutional Commitment

The approved policy provides direction for sustainability engagement across multiple institutional domains. For the purpose of understanding the policy framework within the broader institutional journey, these domains may be viewed as follows:

Policy Domain	Institutional Direction
Curriculum and Teaching–Learning	Progressive integration of sustainability perspectives within relevant curricular, course and learning contexts
Student Projects and Innovation	Encouraging challenge-driven projects and innovative solutions relevant to environmental, societal and developmental concerns
Faculty and Student Capacity Development	Strengthening sustainability knowledge, awareness and competencies through appropriate learning and capacity-building opportunities
Research and Collaboration	Encouraging research, knowledge engagement and collaboration in areas relevant to sustainable development
Community Engagement	Applying disciplinary knowledge and institutional capacity to relevant community and societal challenges
Responsible Campus Practices	Promoting resource conservation, environmental stewardship and responsible management of energy, water and waste

These domains are **interconnected rather than independent areas of action**. Faculty capacity can influence curriculum and learning design; academic learning can shape student projects; projects and disciplinary expertise can extend to community contexts; and responsible campus practices can provide visible institutional examples of sustainability in action.

Thus, the policy provides an umbrella direction capable of connecting the different dimensions of ADCET's sustainability engagement.

4.5 From Policy Direction to Academic Capacity

The development and approval of the Institutional Policy for Sustainable Development represented an important stage in ADCET's journey. It established a **formal institutional commitment and a common direction for progressive sustainability integration**.

However, ADCET recognised that policy direction alone would not automatically translate into meaningful academic practice.

The quality of sustainability integration within curriculum, teaching–learning, student activities and projects depends significantly on the ability of faculty members to:

- recognise sustainability challenges within their disciplinary contexts;
- understand the relationship between SDGs, targets and indicators;
- identify authentic opportunities for academic integration;
- design relevant learning experiences;
- guide students towards challenge-driven problem-solving; and
- identify appropriate evidence of learning or contribution.

The institute therefore identified **faculty capacity development as an essential bridge between policy intent and academic implementation**.

This understanding provided the basis for strengthening sustainability-related faculty learning and subsequently planning the institute-wide hands-on initiative **SDG CONNECT: Integrating Sustainable Development Goals into Teaching–Learning**.

Policy established the institutional direction; faculty capacity was identified as the key enabler for meaningful academic integration.

5. FACULTY CAPACITY DEVELOPMENT FOR SUSTAINABLE DEVELOPMENT:

Faculty members play a pivotal role in translating the principles of sustainable development into meaningful academic practices. Their exposure to contemporary knowledge, emerging technologies and sustainability-related challenges strengthens their ability to **enrich curriculum, contextualise course content, design relevant learning experiences, guide student projects and promote responsible professional practices among learners.**

Recognizing this role, **Annasaheb Dange College of Engineering and Technology (ADCET), Ashta**, encourages faculty members to continuously enhance their knowledge and competencies through quality professional development and lifelong learning opportunities. Participation in **NPTEL courses related to sustainable development and allied domains** has enabled faculty members to develop deeper understanding of the environmental, social and technological dimensions of sustainability and explore their relevance within respective disciplines.

The available faculty learning records demonstrate capacity development across diverse areas including **Education for Sustainable Development, smart and sustainable energy systems, precision agriculture, sustainable food systems, pollution abatement, sustainable power generation, energy economics and sustainability, climate modelling, life-cycle thinking, resource management, emerging technologies and innovation.** The shortlisted records also explicitly identify the sustainability knowledge or competency developed and their relevance to specific SDG targets.

Such faculty capacity development has the potential to create a **multiplier effect within the academic ecosystem**. Knowledge and competencies developed by faculty members can progressively contribute to curriculum enrichment, sustainability-oriented teaching–learning practices, student awareness, project mentoring, research and interdisciplinary academic initiatives.

Faculty Learning → Academic Enrichment → Student Capacity → Projects and Innovation → Sustainability Engagement

The following table presents **selected sustainability-relevant NPTEL courses completed by faculty members of ADCET** and highlights the knowledge and competencies developed along with their relevance to specific Sustainable Development Goals and associated targets.

5.1 Selected Faculty Capacity Development through Sustainability-Relevant NPTEL Courses

Sr. No.	Academic Year & Semester / Term	Faculty Member & Department	NPTEL Course Completed	Sustainability Knowledge / Competency Developed	Relevant SDG & Target
1	2025–26, Even Semester	Dr. V. Subha Seethalakshmi – Electrical Engineering	Education for Sustainable Development	Develops understanding of sustainable development principles and approaches for integrating sustainability perspectives into education and learning practices	SDG 4 – Target 4.7
2	2025–26, Even Semester	Ms. Tejal S. Bandgar – Electrical Engineering	Education for Sustainable Development	Also strengthens faculty capacity to contextualize sustainability challenges and promote sustainability-oriented knowledge, values and learning experiences.	SDG 4 – Target 4.7
3	2025–26, Even Semester	Ms. M. P. Thorushe – Electrical Engineering	Education for Sustainable Development		SDG 4 – Target 4.7
4	2025–26, Even Semester	Ms. Deepali Suryawanshi – Electrical Engineering	Smart Grid: Basics to Advanced Technologies	Develops knowledge of intelligent power systems, grid modernization and efficient energy-management systems Strengthens understanding of smart-grid technologies supporting modern, efficient and sustainable electricity infrastructure	SDG 7 – Target 7.3; SDG 9 – Target 9.4
5	2025–26, Even Semester	Mrs. Jadhav Komal Nagsen – Electrical Engineering	Smart Grid: Basics to Advanced Technologies		SDG 7 – Target 7.3; SDG 9 – Target 9.4
6	2025–26, Even Semester	Mr. Vikas N. Honmane – Artificial	Precision Agriculture	Develops competency in technology-enabled agriculture, data-informed farm management and efficient utilization of agricultural resources	SDG 2 – Target 2.4; SDG 12 – Target 12.2

		Intelligence and Data Science			
7	2025–26, Even Semester	Mrs. Priyanka S. Patil – Artificial Intelligence and Data Science	Education for Sustainable Development	Develops understanding of sustainable development principles and approaches for integrating sustainability perspectives into education and learning practices.	SDG 4 – Target 4.7; SDG 12 – Target 12.8; SDG 13 – Target 13.3
8	2025–26, Even Semester	Dr. Asma A. Shaikh – Artificial Intelligence and Data Science	Business Intelligence and Analytics	Develops data-driven analytical and decision-making competency relevant to monitoring performance, resource utilisation and evidence-based organisational decisions	SDG 8 – Target 8.2; SDG 9 – Target 9.5
9	2025–26, Even Semester / Term II	Mr. Ashish A. Patil – Food Technology	Food Microbiology for Safe and Sustainable Food Systems	Develops competency in food safety, microbial risk understanding and sustainable food-system practices supporting a safe food supply	SDG 2 – Target 2.1; SDG 3 – Target 3.9; SDG 12 – Target 12.3
10	2025–26, Even Semester / Term II	Dr. Kishor K. Giram – Food Technology	Modern Food Packaging Technologies: Regulatory Aspects and Global Trends	Strengthens knowledge of modern packaging systems and technological approaches relevant to sustainable food value chains and waste reduction	SDG 9 – Target 9.4; SDG 12 – Target 12.5
11	2025–26, Even Semester	Dr. P. D. Kulkarni – Mechanical Engineering	Effective Engineering Teaching in Practice	Strengthens competency in learner-centred engineering education and pedagogical practices supporting effective sustainability-oriented learning experiences	SDG 4 – Targets 4.7, 4.c
12	2025–26, Even Semester	Dr. S. V. Nishandar – Mechanical Engineering	Innovation by Design	Develops design-led innovation and problem-solving competency relevant to developing context-responsive and sustainable engineering solutions	SDG 9 – Targets 9.4, 9.5

13	2025–26, Even Semester	Dr. A. G. Sanadi – Mechanical Engineering	Research Methodology	Strengthens systematic research, evidence generation and analytical competency required for investigating sustainability challenges and evaluating engineering solutions	SDG 4 – Target 4.7; SDG 9 – Target 9.5
14	2025–26, Odd Semester	Dr. S. P. Chavan – Mechanical Engineering	Basic Environmental Engineering and Pollution Abatement	Develops understanding of pollution sources, environmental engineering principles and pollution-abatement approaches	SDG 6 – Target 6.3; SDG 11 – Target 11.6; SDG 12 – Target 12.4

The selected courses demonstrate that sustainability-relevant faculty capacity at ADCET extends across **multiple academic disciplines and knowledge domains**. The records include faculty learning in sustainable development education, energy and electrical systems, environmental engineering, agriculture, food systems, digital technologies, research, innovation and responsible resource utilization.

This distributed faculty knowledge base provides an important academic foundation for ADCET's progressive approach towards sustainability integration. As the institutional approach evolved, the need was also recognized to complement such **discipline-specific knowledge and individual professional development with a common understanding and methodology for integrating sustainability into teaching–learning**. This need provided the basis for the institute-wide faculty capacity-building initiative: **SDG CONNECT: Integrating Sustainable Development Goals into Teaching–Learning**

Elite
NPTEL ONLINE CERTIFICATION
(Funded by the MoE, Govt. of India)

This certificate is awarded to
SUBHA SEETHALAKSHMI
for successfully completing the course

Education for Sustainable Development

with a consolidated score of **100 %**

Online Assignments	25/25	Proctored Exam	75/75
--------------------	-------	----------------	-------

Total number of candidates certified in this course: 21132

Jan-Apr 2026
(12 week course)





Prof. Haimanti Banerji
 Coordinator, NPTEL
 IIT Kharagpur

 Indian Institute of Technology Kharagpur
 

NPTEL-AICTE
Faculty Development Programme
(Funded by the MoE, Govt. of India)

This certificate is awarded to
DEEPAI ANANDRAO SURYAWANSHI
for successfully completing the course

Smart Grid: Basics to Advanced Technologies

with a consolidated score of **65 %**


Prof. Andrew Thangaraj
 NPTEL Coordinator
 IIT Madras



 (Jan-Apr 2026)

Roll No: NPTEL26EE84S552000244
 Duration of NPTEL course : 12 Weeks

Elite
NPTEL ONLINE CERTIFICATION
(Funded by the MoE, Govt. of India)

This certificate is awarded to
PRIYANKA SUSHANT PATIL
for successfully completing the course

Education for Sustainable Development

with a consolidated score of **91 %**

Online Assignments	25/25	Proctored Exam	66/75
--------------------	-------	----------------	-------

Total number of candidates certified in this course: 21132

Jan-Apr 2026
(12 week course)




Prof. Haimanti Banerji
 Coordinator, NPTEL
 IIT Kharagpur

 Indian Institute of Technology Kharagpur
 

Elite
NPTEL ONLINE CERTIFICATION
(Funded by the MoE, Govt. of India)

This certificate is awarded to
MANOJ HIRJI MOTA
for successfully completing the course

Basics of Climate Modeling

with a consolidated score of **82 %**

Online Assignments	25/25	Proctored Exam	56.63/75
--------------------	-------	----------------	----------

Total number of candidates certified in this course: 150


Prof. B Umashankar
 Chairperson, Centre for Continued Education (CCE)
 IIT Hyderabad


Feb-Apr 2026
 (8 week course)


Prof. Andrew Thangaraj
 NPTEL Coordinator
 IIT Madras

 Indian Institute of Technology Hyderabad
 

Roll No: NPTEL26CE08S252000102
 To verify the certificate

No. of credits recommended: 3

Sample NPTEL Certificates, Faculty members

6. SDG CONNECT: INSTITUTE-WIDE FACULTY CAPACITY BUILDING

From SDG Awareness to Academic Integration:

As ADCET's engagement with sustainable development progressively evolved, the institute recognized the need to develop **greater uniformity and a deeper common understanding of SDG integration among faculty members**. While awareness of the 17 Sustainable Development Goals had increased, meaningful academic integration required faculty to move beyond broad goal-level association and understand the relationship between **sustainability challenges, SDG targets, indicators, disciplinary contexts and evidence of learning or contribution**.

To address this need, ADCET organised an institute-wide hands-on faculty capacity-building programme titled **“SDG CONNECT: Integrating Sustainable Development Goals into Teaching–Learning”** on **29 June 2026, from 9:30 a.m. to 1:30 p.m.** The programme was attended by **159 faculty members representing academic programs across the institute**.

The initiative was designed not merely as an awareness session on the SDGs, but as a **practical academic exercise for contextualizing sustainable development within engineering and professional education**.

The central focus was to move from **“Which SDG can be mapped?”** towards **“What sustainability challenge is being addressed, and how can learning meaningfully respond to it?”**

6.1 Academic Approach Introduced:

The programme introduced faculty members to a structured pathway for understanding sustainability within academic contexts:

Sustainability Challenge → Relevant SDG → Specific Target → Indicator Perspective → Academic / Engineering Intervention → Evidence

The sessions emphasized the role of higher education in sustainable development, the principles of **Education for Sustainable Development (ESD)** and the importance of faculty members as academic multipliers capable of influencing curriculum, learning experiences, student projects and professional perspectives. The programme design explicitly moved from understanding sustainable development and the global SDG framework towards the faculty challenge of identifying targets, indicators and evidence.

A significant aspect of the methodology was the interpretation of official SDG indicators from an **engineering education perspective**. Faculty members were encouraged to understand the broader intent of an indicator and identify meaningful academic or engineering contributions without directly claiming achievement of national- or global-level indicators.

6.2 Hands-on Course-Level Application

The course **Environmental Engineering** was used as a representative academic model to demonstrate the methodology. Existing course content, learning activities, assessment rubrics and evidence were examined from a sustainability perspective.

The model demonstrated how real water and environmental challenges could be connected with course learning, competency-based assessment, relevant SDG targets and traceable evidence. The course-level example specifically linked content, field/community learning, competency assessment and SDG alignment rather than proposing a separate sustainability module.

Following the demonstration, **each participating academic program prepared one representative course-level sustainability integration sample** by applying the approach within its own disciplinary context.

This hands-on exercise was important because it reinforced that:

Sustainability integration does not require every course to become an environmental course; it requires faculty to identify authentic sustainability challenges and learning opportunities relevant to their discipline.

6.3 Immediate Outputs and Emerging Significance

The programme resulted in three important immediate outcomes:

- development of a **common academic language and structured approach** for SDG contextualization;
- hands-on engagement of **159 faculty members** with sustainability-oriented academic integration; and
- preparation of **representative course-level sustainability integration samples by participating academic programs**.

The initiative also provided the academic basis for strengthening the **ADCET Education for Engineering and Sustainable Development (EESD) Faculty Toolkit**, which supports faculty in course integration, sustainable learning experiences, student project design and departmental sustainability planning. The toolkit follows a progressive pathway from identifying sustainability opportunities to integration, learning design, application and departmental action.

ADCET recognises that the long-term academic impact of the initiative will emerge progressively through curriculum enrichment, learning design, student projects and evidence-oriented academic practices. The programme is therefore viewed as a **capacity-building and enabling intervention rather than a one-time claim of complete SDG integration**.

SDG CONNECT marked an important transition in ADCET's journey—from distributed awareness of the SDGs towards a common, discipline-sensitive and academically applicable methodology for sustainability integration.



SDG CONNECT: One day Hands on workshop

7. ADCET EESD FACULTY TOOLKIT

A Practical Framework for Integrating Sustainability into Engineering Education

The faculty interactions and hands-on academic exercises conducted through **SDG CONNECT** reinforced an important institutional understanding: **awareness of sustainable development alone does not automatically translate into academic integration**. Faculty members require a practical and reusable mechanism to identify sustainability opportunities within their disciplines and progressively translate them into courses, learning experiences and student projects.

To support this process, ADCET developed the **Education for Engineering and Sustainable Development (EESD) Faculty Toolkit — A Practical Toolkit for Integrating Sustainability into Engineering Education**.

The toolkit is designed to support faculty members in moving from **awareness towards academic application**. Rather than beginning with the question “Which SDG can be mapped to the course?”, it encourages faculty to first examine the **disciplinary context, sustainability challenge, engineering opportunity and learning potential**.

Identify the Challenge → Explore the Opportunity → Integrate Learning → Develop Competencies → Align with SDGs → Generate Evidence

The EESD Toolkit supports sustainability integration within **curriculum, teaching–learning, student projects and departmental planning** through five progressive academic tools.

7.1 The Five EESD Tools (Annexure B)

EESD Tool	Purpose	Expected Academic Outcome
Tool 1 – Sustainability Lens	Identify sustainability challenges and opportunities within the disciplinary or course context before mapping SDGs	Sustainability opportunities identified
Tool 2 – Course Sustainability Integration	Examine course outcomes, modules, teaching strategies, learning activities and assessment for meaningful sustainability integration	Course-level integration plan

Tool 3 – Sustainable Learning Experience	Design sustainability-focused assignments, laboratories, field activities, case studies or experiential learning interventions	Sustainability learning activity designed
Tool 4 – Sustainable Project Design	Develop student project concepts around real-world sustainability challenges and engineering solutions	Sustainability-oriented project concept
Tool 5 – Department Sustainability Action Planning	Identify departmental strengths, priority areas and feasible directions for progressive sustainability engagement	Department-level action plan

The tools are intended to provide **academic guidance rather than a rigid compliance format**. They recognise that the nature of sustainability engagement differs across engineering and professional disciplines and therefore allow faculty members to identify contextually relevant opportunities.

The toolkit follows a progressive implementation pathway:

EXPLORE → INTEGRATE → DESIGN → APPLY → TRANSFORM

This pathway reflects the movement from identifying sustainability opportunities to course-level integration, learning design, application through projects and progressive departmental action.

7.2 Course-Level Application: Environmental Engineering as a Worked Example

To demonstrate the practical application of the toolkit, **Environmental Engineering (2CVPC315)** from the B.Tech. Civil Engineering program was developed as a representative course-level worked example. (**Annexure C**)

The exercise examined the existing **Course Outcomes, module-wise content, teaching–learning activities, competency-based assessment rubrics and available evidence** from a sustainability perspective. Sustainability opportunities were identified in areas such as safe water supply, water treatment, sanitation, wastewater management, pollution control and community water-quality assessment.

Existing experiential learning activities—including **assessment of water quality from a Water Treatment Plant, assessment of stream pollution and community water-testing camps**—were further contextualized as sustainability learning experiences. The activities connect real water-related

challenges with engineering concepts, investigation, data interpretation, professional judgement, community engagement and competency-based assessment.

The worked example demonstrated a central principle of the ADCET EESD approach:

A course may not require a separate sustainability module when its existing technical content and learning experiences already address authentic sustainability challenges. The need is to make the integration visible, purposeful, assessable and evidence-based.

This conclusion is explicitly reflected in the course-level EESD integration summary developed for Environmental Engineering.

7.3 Towards Progressive Academic Application:

The ADCET EESD Faculty Toolkit provides a **common academic structure while retaining disciplinary flexibility**. It enables faculty members to examine existing academic practices, identify meaningful sustainability opportunities and progressively strengthen learning experiences without forcing artificial SDG mapping.

The toolkit is therefore viewed as an **academic enabling mechanism** within ADCET's sustainability journey. Its purpose is not to mandate sustainability integration in every course in an identical manner, but to support relevant courses, activities and projects in developing a clearer connection between:

Disciplinary Learning → Real Sustainability Challenge → Student Action → Graduate Competencies → SDG Relevance → Evidence

As the institutional approach evolves, the toolkit provides a practical basis for **progressive course-level application, sustainability-oriented experiential learning, challenge-driven student projects and evidence-conscious academic documentation**.

The ADCET EESD Faculty Toolkit represents the transition from understanding sustainability to purposefully designing educational opportunities for sustainable development.

Part III –

Student Capacity, Learning and Innovation

8. Student Capacity Development for Sustainable Development

9. Student Projects for Sustainable Development

10. Challenge-Driven Student Innovation — SDG Hackathon

8. STUDENT CAPACITY DEVELOPMENT FOR SUSTAINABLE DEVELOPMENT

Building Sustainability Awareness and Interdisciplinary Learning among Students:

Developing future professionals capable of responding to contemporary environmental, societal and technological challenges requires students to acquire knowledge that extends beyond conventional disciplinary boundaries. Sustainability challenges are inherently interconnected and require an understanding of **environmental systems, energy, climate, resources, technology, society, ethics and responsible development**.

ADCET encourages students to engage with contemporary and interdisciplinary knowledge through curriculum, experiential learning and additional learning opportunities. Student participation in **NPTEL courses related to sustainable development and allied areas** represents one of the important avenues for strengthening such knowledge and awareness.

The available student learning records indicate participation in courses covering diverse themes such as **sustainable development, environmental studies, climate and energy, electric vehicles, renewable energy, smart cities, waste management, agriculture, food systems, water and natural resources, sustainable technologies and responsible industrial practices**.

A noteworthy dimension of student learning is also the engagement with courses that encourage reflection on **traditional knowledge, cultural perspectives, indigenous practices and context-sensitive approaches to knowledge and development**. Such learning broadens students' understanding of sustainability by encouraging them to appreciate that responsible development requires not only technological advancement, but also awareness of **local contexts, inherited knowledge systems, societal values and the relationship between communities and natural resources**.

Sustainability Education → Broader Awareness → Interdisciplinary Understanding → Responsible Professional Perspective

The significance of these learning engagements extends beyond course certification. Exposure to sustainability-related themes can progressively enable students to:

- understand contemporary environmental and societal challenges;
- recognise interconnections between technology, resources and human well-being;
- examine engineering and professional decisions from broader sustainability perspectives;

- develop interdisciplinary and systems-oriented thinking;
- identify relevant challenges for experiential learning and student projects; and
- strengthen their preparedness for responsible professional practice.

8.1 Selected Sustainability-Relevant NPTEL Courses Completed by Students

Based on the data received from academic departments, student-completed NPTEL courses were examined for their **direct or meaningful relevance to sustainable development and associated SDG themes**.

The following table presents selected courses along with the **Academic Year and Semester, NPTEL course, department, number of students completing the course, sustainability knowledge or competency developed, and relevant SDG targets**.

Sr. No.	Academic Year & Semester	NPTEL Course & Department	No. of Students certified	Sustainability Knowledge / Competency Developed	Relevant SDG & Target
1	2025–26, Even Semester	Strategies for Sustainable Development – Civil Engineering	23	Develops understanding of strategic approaches to sustainable development, responsible resource use and integrated responses to contemporary sustainability challenges	SDG 12 – Target 12.8; SDG 13 – Target 13.3
2	2025–26, Even Semester	Education for Sustainable Development – Artificial Intelligence and Data Science	40	Develops sustainability literacy and understanding of environmental, social and economic dimensions of responsible development, strengthening sustainability-oriented perspectives among technology students	SDG 4 – Target 4.7
3	2025–26, Even Semester / Term II	Business Fundamentals for Entrepreneurs – Food Technology	12	Develops entrepreneurial understanding and capacity to translate ideas into viable enterprises, supporting productive activity, innovation and enterprise development	SDG 8 – Target 8.3

4	2025–26, Odd Semester	Education for Sustainable Development – Civil Engineering	10	Develops understanding of sustainable development principles and the role of education in addressing environmental, social and economic challenges	SDG 4 – Target 4.7
5	2025–26, Odd Semester	Indian Knowledge System – Civil Engineering	32	Develops awareness of traditional knowledge, cultural perspectives and context-sensitive approaches relevant to responsible and sustainable development	SDG 4 – Target 4.7
6	2025–26, Odd Semester	Indian Knowledge System – Electrical Engineering	158	Enhances appreciation of indigenous knowledge, cultural diversity and traditional perspectives supporting locally relevant and responsible approaches to development	SDG 4 – Target 4.7
7	AY 2025–26 (Odd & Even Semester)	Introduction to Atmospheric and Space Sciences - Department of Aeronautical Engineering	6	Developed scientific understanding of climate systems, atmospheric processes, and environmental sustainability, enabling students to appreciate climate change impacts on aerospace systems and sustainable development.	SDG 13 – Climate Action (Target 13.3)
8	AY 2025–26 (Odd & Even Semester)	Aeroengine Gas Turbine Cycle- Department of Aeronautical Engineering	2	Enhanced competency in energy-efficient propulsion systems, gas turbine performance analysis and clean energy technologies for sustainable aerospace applications.	SDG 7 – Affordable and Clean Energy Target 7.3:
9	AY 2025–26 (Odd & Even Semester)	Indian Knowledge System- Department of Aeronautical Engineering	48	Developed understanding of sustainable living practices, ethical values, indigenous knowledge systems and responsible engineering approaches aligned with holistic sustainable development.	SDG 4 – Quality Education Target 4.7

Elite

NPTEL ONLINE CERTIFICATION
(Funded by the MoE, Govt. of India)

This certificate is awarded to
FALGUNI SUBHASH UDAGIRE
for successfully completing the course

Education for Sustainable Development

with a consolidated score of **100 %**

Online Assignments	25/25	Proctored Exam	75/75
--------------------	-------	----------------	-------

Total number of candidates certified in this course: 21132

Jan-Apr 2026
(12 week course)

Prof. Haimanti Banerji
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

Roll No: NPTEL26HS58S1452000785 To verify the certificate No. of credits recommended: 4

Elite

NPTEL ONLINE CERTIFICATION
(Funded by the MoE, Govt. of India)

This certificate is awarded to
SANJANA BAJARANG KUMBHAR
for successfully completing the course

Education for Sustainable Development

with a consolidated score of **73 %**

Online Assignments	24.69/25	Proctored Exam	48/75
--------------------	----------	----------------	-------

Total number of candidates certified in this course: 21132

Jan-Apr 2026
(12 week course)

Prof. Haimanti Banerji
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

Roll No: NPTEL26HS58S1452000519 To verify the certificate No. of credits recommended: 4

SWAYAM ONLINE COURSE CERTIFICATION

This certificate is awarded to
MUSTAKIM RASHID SANDE
for successfully completing the 3 credit course
Indian Knowledge System
July - December 2025
with the consolidated score of **95%**
in the proctored examination held on 11-12-2025
offered by **Dr. Roli Pradhan**

NATIONAL COORDINATOR
Director NITTTR, Chennai

DIRECTOR
NITTTR, Bhopal

Roll No: MR14020122

SWAYAM ONLINE COURSE CERTIFICATION

This certificate is awarded to
SAMRUDDHI SACHIN PATIL
for successfully completing the 3 credit course
Indian Knowledge System
July - December 2025
with the consolidated score of **87%**
in the proctored examination held on 11-12-2025
offered by **Dr. Roli Pradhan**

NATIONAL COORDINATOR
Director NITTTR, Chennai

DIRECTOR
NITTTR, Bhopal

Roll No: MR14020095

Sample NPTEL Certificates, Students

8.2 From Sustainability Knowledge to Student Engagement:

The selected learning records demonstrate that sustainability-related student capacity development at ADCET extends across **multiple academic programs and thematic domains**. The participation of students from different disciplines is particularly relevant because sustainable development requires contributions from diverse areas of engineering, technology and professional practice. These additional learning engagements provide students with broader perspectives that can complement curricular learning and influence their understanding of **real-world challenges, technological alternatives and responsible development**.

ADCET's evolving academic approach seeks to progressively connect such student awareness and interdisciplinary learning with **experiential activities, challenge identification, project-based learning and innovation**. Knowledge and awareness become more meaningful when students apply them to authentic problems and develop context-relevant solutions.

This transition from **student capacity development to application through projects and innovation** is reflected in the sustainability-oriented mini, minor and capstone projects undertaken by students across academic programs.

9. STUDENT PROJECTS FOR SUSTAINABLE DEVELOPMENT

Experiential and Immersive Learning through Sustainability-Oriented Projects:

Student projects provide an important platform for translating disciplinary knowledge into **experiential and immersive learning**. Through mini, minor and capstone projects, students engage with real-world problems, investigate contextual challenges, apply engineering and technological knowledge and develop solutions through analysis, design, experimentation and innovation.

From the perspective of sustainable development, project-based learning offers significant opportunities for students to explore challenges related to **water, energy, agriculture, environmental quality, waste and resource utilisation, healthcare, sustainable infrastructure, industrial systems, safety and societal well-being**. Such projects enable students to understand that engineering and technological decisions often have implications extending beyond immediate technical performance to environmental, social and resource-related contexts.

Real-World Challenge → Investigation → Application of Disciplinary Knowledge → Engineering / Technological Intervention → Sustainability Relevance

An examination of student project records across academic programs at ADCET identified several projects having **direct or meaningful relevance to sustainable development and specific SDG targets**. These projects were undertaken at different stages of the institute's evolving sustainability journey and include **mini projects, minor projects and final-year capstone projects**.

The selected projects should not necessarily be interpreted as outcomes of the recently developed Institutional Policy for Sustainable Development or the EESD framework. Rather, they demonstrate the **existing potential of project-based learning at ADCET to engage students with sustainability-relevant challenges**. The evolving institutional methodology now provides an opportunity to progressively strengthen this engagement through more deliberate challenge identification, target-level contextualisation and evidence-oriented project design.

9.1 Selected Student Projects Relevant to Sustainable Development

Based on the project data received from academic departments, projects were examined considering the **nature of the challenge addressed, disciplinary and technological intervention, sustainability relevance and relationship with specific SDG targets**.

The following table presents a representative selection of student projects from different academic programs and project categories.

Sr. No.	Project Title / Type / Department	Sustainability Challenge	Relevant SDG & Target	Contribution towards Sustainable Development
1	New Product Development from Millets – Mini Project / Food Technology	Nutritional security and need for wider utilisation of climate-resilient crops	SDG 2 – Targets 2.1, 2.4; SDG 3 – Target 3.4; SDG 12 – Target 12.2	Develops value-added food products using nutrient-rich and climate-resilient millets, supporting dietary diversity and responsible utilization of local food resources.
2	Millet Bread Formulation – Mini Project / Food Technology	Limited dietary diversity and dependence on conventional cereal ingredients	SDG 2 – Targets 2.1, 2.4; SDG 3 – Target 3.4	Incorporates millets into bakery products to improve nutritional quality and encourage utilization of climate-resilient grains.
3	Moong and Wheat Flour Biscuit Formulation – Mini Project / Food Technology	Need for affordable, nutritionally improved plant-based food products	SDG 2 – Target 2.1; SDG 3 – Target 3.4	Develops a protein-enhanced food product through efficient use of plant-based ingredients and improved dietary diversity.
4	Smart Mess Management System – Mini Project / AI & Data Science	Food wastage and inefficient food-demand management	SDG 2 – Target 2.1; SDG 12 – Target 12.3	Uses digital management to improve meal planning and resource utilization, with potential to reduce avoidable food waste.
5	AI-Based Fertilizer Inventory and Sales Management System – Mini Project / AI & Data Science	Inefficient management of agricultural inputs and fertilizer resources	SDG 2 – Target 2.4; SDG 12 – Target 12.2	Applies digital and AI-enabled inventory management to improve agricultural-input planning and support more efficient resource utilization.
6	Crop Yield Prediction Using Machine Learning – Mini Project / CSE (IoT-CSBT)	Uncertainty in agricultural productivity and need for data-informed farm decisions	SDG 2 – Target 2.4; SDG 9 – Target 9.5	Applies machine learning to agricultural data for crop-yield prediction and evidence-based farm planning.
7	Development of Hydrogen Storage System for UAVs Type: Product Development	Developing clean and efficient energy storage technologies for next-generation unmanned	SDG 7 – Affordable and Clean Energy Target 7.3	Promotes sustainable aviation by exploring hydrogen-based energy storage solutions for UAVs, supporting cleaner propulsion

	Department: Aeronautical Engineering	aerial vehicles to reduce dependence on conventional fossil fuels.		technologies and advancing low-carbon aerospace applications.
8	Design and Development of Micro UAV for Vision-Based Autonomous Navigation of Agribots Type: Product Development Department: Aeronautical Engineering	Improving agricultural productivity through autonomous aerial technologies while reducing manual intervention and operational risks.	SDG 8 – Target 8.2	Supports precision agriculture by integrating UAV technology with autonomous navigation, improving operational efficiency, promoting smart farming practices, and enhancing technology-driven rural productivity.
9	Conceptual Study of Aerodynamic Flow Behaviour over Buoyant Envelopes Type: Conceptual Study Department: Aeronautical Engineering	Reducing aerodynamic losses and improving energy efficiency in lighter-than-air aerial platforms to minimize environmental impact.	SDG 13 – Target 13.2	Investigates aerodynamic optimization of lighter-than-air systems to reduce energy demand and emissions, contributing to the development of environmentally sustainable aerial transportation concepts.
10	Plant Disease Detection System – Mini Project / CSE (IoT-CSBT)	Crop loss due to delayed identification of plant diseases	SDG 2 – Target 2.4	Supports early identification of plant-health concerns through digital detection, contributing to improved crop management and agricultural productivity.
11	Shetkari Inventory Management System – Mini Project / Computer Science & Engineering	Inefficient management of agricultural resources and farm-related inventory	SDG 2 – Target 2.4; SDG 8 – Target 8.2	Provides a digital inventory-management solution to support farmers and improve operational efficiency in agricultural activities.
12	Website for Farm Products – Bhosale Farms – Mini Project / Computer Science & Engineering	Limited digital market access for local agricultural producers	SDG 2 – Target 2.3; SDG 8 – Target 8.3	Improves digital visibility and market connectivity for agricultural products, supporting local producers and farm-based enterprise.
13	Web Development for Alsund Gram Panchayat – Mini Project / Computer Science & Engineering	Limited digital access to local governance information and services	SDG 16 – Targets 16.6, 16.10	Develops a digital platform for accessible local-governance information and improved communication with citizens.

14	Gram Panchayat Karyalay Junoni Website – Mini Project / Computer Science & Engineering	Need for accessible and transparent local-governance communication	SDG 16 – Targets 16.6, 16.10	Supports digital access to Gram Panchayat information and strengthens citizen-oriented local governance.
15	Web Portal for Haripur Multispeciality Hospital – Mini Project / Computer Science & Engineering	Need for improved access to healthcare-related information and services	SDG 3 – Target 3.8; SDG 9 – Target 9.c	Develops a digital interface to improve access to hospital information and healthcare-service communication.
16	Blockchain-Based Decentralized Application for Securing Health Records over Ethereum Network Using IPFS – Project / CSE (IoT-CSBT)	Security, privacy and integrity of digital health information	SDG 3 – Target 3.8; SDG 9 – Target 9.5	Applies blockchain and distributed storage technologies to improve security and integrity of digital health records.
17	Enhancing Railway Line Safety and Accessibility Using Machine-Learning-Based Image Processing – Project / CSE (IoT-CSBT)	Railway infrastructure defects and transport-safety risks	SDG 9 – Target 9.1; SDG 11 – Target 11.2	Uses machine-learning-based image processing to support railway-line condition assessment and safer transport infrastructure.
18	Solar-Powered Electric Vehicle Charging with IoT – Minor Project / CSE (IoT-CSBT)	Dependence of EV charging on conventional electricity and need for clean mobility infrastructure	SDG 7 – Target 7.2; SDG 11 – Target 11.2; SDG 13 – Target 13.2	Integrates solar energy and IoT monitoring for electric-vehicle charging, supporting renewable-energy utilization and cleaner mobility.
19	IoT-Based Automated Sustainable Light and Fan Control System – Minor Project / CSE (IoT-CSBT)	Unnecessary building-energy consumption due to manual operation	SDG 7 – Target 7.3; SDG 12 – Target 12.2	Automates lighting and fan operation to improve energy-use efficiency and reduce avoidable electricity consumption.
20	Smart Energy Meter – Minor Project / CSE (IoT-CSBT)	Limited visibility of electricity consumption and inefficient energy-use behaviour	SDG 7 – Target 7.3	Enables energy-consumption monitoring to support informed energy management and efficient electricity use.

21	Smart Waste Management System Using Compression Technique – Minor Project / CSE (IoT-CSBT)	Increasing solid-waste volume and inefficient waste handling	SDG 11 – Target 11.6; SDG 12 – Target 12.5	Applies waste-compression technology to improve handling efficiency and support better solid-waste management.
22	Smart Solar Monitoring System – Mini Project / CSE (IoT-CSBT)	Need for effective monitoring of solar-energy system performance	SDG 7 – Targets 7.2, 7.3	Develops a digital monitoring solution to support performance assessment and effective utilization of solar-energy systems.
23	AgreeTechHub – AI Model for Plant Disease Detection – Mini Project / CSE (IoT-CSBT)	Crop losses and delayed diagnosis of plant disease	SDG 2 – Target 2.4; SDG 9 – Target 9.5	Applies AI to plant-disease identification, supporting timely agricultural decision-making and sustainable crop management.
24	Automatic Air Dust Monitoring and Water Spray Dust Suppression System – Product Development / Civil Engineering	Airborne dust exposure and particulate pollution at construction or industrial locations	SDG 3 – Target 3.9; SDG 11 – Target 11.6	Integrates dust monitoring with automated suppression to reduce particulate exposure and improve local environmental quality.
25	Kitchen Waste Mini Composter – Product Development / Civil Engineering	Disposal of biodegradable kitchen waste and loss of recoverable organic resources	SDG 11 – Target 11.6; SDG 12 – Targets 12.3, 12.5	Promotes decentralized composting and recovery of organic waste, reducing disposal burden and supporting circular resource use.
26	Portable Rainwater Filtration Unit Using Rotating Mesh Technology – Product Development / Civil Engineering	Need for simple treatment and beneficial utilisation of harvested rainwater	SDG 6 – Targets 6.3, 6.4	Develops a portable filtration approach for improving rainwater quality and supporting local water-resource utilization.
27	SmartCure Beam – IoT-Based Real-Time Curing Monitoring System for Concrete – Product Development / Civil Engineering	Inadequate concrete curing leading to poor durability and premature material/infrastructure deterioration	SDG 9 – Targets 9.1, 9.4; SDG 12 – Target 12.2	Uses IoT-based monitoring to improve curing control, supporting concrete durability and more effective utilization of construction resources.

28	GeoGuard – Smart Soil Stability Monitoring System for Construction Sites – Product Development / Civil Engineering	Soil-instability risks and safety concerns at construction sites	SDG 9 – Target 9.1; SDG 11 – Target 11.b	Provides real-time soil-stability monitoring to support safer and more resilient construction practices.
29	Low-Cost Ultrasonic Sensor-Based Tide Monitoring System – Product Development / Civil Engineering	Need for affordable monitoring of changing coastal/tidal water conditions	SDG 13 – Target 13.1; SDG 14 – Target 14.a	Develops a low-cost monitoring system to generate tidal information relevant to environmental observation and climate-related coastal resilience.
30	Smart Water Level Management System – Product Development / Civil Engineering	Water wastage and inefficient management of storage systems	SDG 6 – Target 6.4; SDG 12 – Target 12.2	Automates water-level monitoring and management to reduce overflow and improve efficient use of water resources.
31	KaamSetu: Web-Based Digital Platform for Civil Construction Workforce Connectivity and Service Management – Product Development / Civil Engineering	Fragmented employment connectivity and service access for construction workers	SDG 8 – Targets 8.3, 8.5; SDG 9 – Target 9.c	Creates a digital interface connecting construction workers and service requirements, supporting workforce access and organized service management.
32	Rapid-Deploy Interlocking Modular Structural System (RIMSS) – Product Development / Civil Engineering	Need for adaptable and rapidly deployable structural solutions	SDG 9 – Target 9.1; SDG 11 – Targets 11.5, 11.b	Develops a modular structural concept for rapid deployment, with potential application in resilient and emergency infrastructure.
33	Ready-Mix Cube of Asphalt for Repairing Flexible Pavement – Product Development / Civil Engineering	Delays and material-management challenges in small-scale pavement repair	SDG 9 – Target 9.1; SDG 11 – Target 11.2	Develops a ready-to-use pavement-repair product to support timely maintenance and improved serviceability of transport infrastructure.
34	Design of Sustainable Water Supply System and	Rural water security and inadequate wastewater-	SDG 6 – Targets 6.1, 6.3, 6.4;	Develops an integrated village-level approach for safe water supply, efficient water

	Wastewater Management System for Pharnewadi Village – Capstone Project / Civil Engineering	management infrastructure	SDG 11 – Target 11.6	management and improved wastewater handling.
35	Sustainable Low-Cost Wastewater Management Plan for Dhavali Village – Capstone Project / Civil Engineering	Need for affordable and context-appropriate rural wastewater management	SDG 6 – Target 6.3; SDG 11 – Target 11.6	Explores a low-cost wastewater-management strategy suited to local conditions, supporting pollution prevention and improved rural sanitation infrastructure.
36	Performance Evaluation of Interlocking Soil Blocks Incorporating Plastic Waste for Sustainable Housing – Capstone Project / Civil Engineering	Plastic-waste accumulation and resource-intensive construction materials	SDG 11 – Target 11.1; SDG 12 – Targets 12.2, 12.5	Investigates beneficial utilization of plastic waste in construction blocks, supporting material recovery and resource-conscious housing solutions.
37	Assessment of the Impact of Chemical Fertilizers and Pesticides on Groundwater and Soil Quality in Shirol Taluka – Capstone Project / Civil Engineering	Soil and groundwater degradation associated with intensive agrochemical use	SDG 6 – Targets 6.3, 6.6; SDG 15 – Target 15.3	Assesses environmental impacts of agricultural chemical use to generate evidence for soil and groundwater protection and more responsible resource management.
38	Finite Element Analysis and Prototype Development of EPS-Based Floating House Foundation for Flood Disaster Mitigation – Capstone Project / Civil Engineering	Vulnerability of settlements and housing infrastructure to flooding	SDG 9 – Target 9.1; SDG 11 – Targets 11.5, 11.b; SDG 13 – Target 13.1	Develops and evaluates a flood-adaptive foundation concept to improve infrastructure resilience and reduce disaster-related vulnerability.
39	Solar-Powered PEM Electrolyser for Green Hydrogen Production – Mini Project / Electrical Engineering	Dependence on carbon-intensive energy and need for cleaner energy carriers	SDG 7 – Target 7.2; SDG 9 – Target 9.4; SDG 13 – Target 13.2	Integrates solar energy with electrolysis for green-hydrogen production, demonstrating a clean-energy pathway and low-carbon energy technology.

40	Hybrid Power System with Integration of Wind, Battery and Solar PV System – Capstone Project / Electrical Engineering	Renewable-energy intermittency and reliable clean-energy supply	SDG 7 – Targets 7.2, 7.3; SDG 13 – Target 13.2	Integrates multiple renewable-energy sources with battery storage to improve energy reliability and utilization of clean-energy resources.
----	--	---	---	--

The selected projects reflect the **breadth and diversity of sustainability-related student engagement across ADCET**. The project themes extend across environmental protection, water and resource management, clean and efficient energy systems, agriculture and food systems, waste utilization and circularity, sustainable construction, health and well-being, intelligent infrastructure, industrial efficiency and technology-enabled societal solutions.

The multidisciplinary nature of these projects is significant. It demonstrates that sustainability-oriented problem-solving is **not restricted to environmental or civil engineering domains**. Electrical and energy systems, mechanical and manufacturing technologies, artificial intelligence and data-driven solutions, computing, food technology and other professional disciplines can contribute to sustainable development through their own disciplinary strengths. Few significant products developed includes following projects shown below.



EV Drive Trainer Kit



Solar Cleaning System

9.2 From Project Mapping to Challenge-Driven Project Design

The review of existing student projects has provided ADCET with an important academic insight: **many student projects already address sustainability-relevant challenges, even when sustainability or an SDG was not explicitly identified at the initial stage of project formulation.**

The institute's evolving approach therefore seeks to move progressively from the **retrospective recognition of SDG relevance** towards a more **prospective and challenge-driven approach to project design.**

Earlier Perspective:

Project Developed → Sustainability Relevance Identified → Relevant SDG Mapped

Emerging Perspective:

Sustainability Challenge Identified → Relevant Context and SDG Target Understood → Project Intervention Designed → Evidence of Contribution Examined

This transition does not imply that every student project must be linked with an SDG. The emphasis is on encouraging students and project mentors, **where relevant**, to begin with a clearer understanding of the real-world challenge, its wider sustainability context and the potential contribution of the proposed engineering or technological intervention.

The **Sustainable Project Design component of the ADCET EESD Faculty Toolkit** provides a practical academic mechanism to support this progression.

The objective is not to increase the number of SDG-mapped projects, but to strengthen the quality of student problem identification, sustainability contextualization and challenge-driven engineering innovation.

The selected student projects presented in this section therefore demonstrate both the **existing breadth of sustainability-relevant student work at ADCET** and the **academic potential for more structured sustainability-oriented project design in the future.**

10. CHALLENGE-DRIVEN STUDENT INNOVATION TOWARDS SUSTAINABLE DEVELOPMENT — SDG HACKATHON

Transforming Sustainability Challenges into Student Innovation Opportunities

Innovation becomes more meaningful when students are encouraged to engage with **authentic environmental, societal and developmental challenges** and apply their disciplinary knowledge to explore practical solutions. Challenge-driven learning provides students with opportunities to move beyond predefined academic problems and engage in **problem identification, contextual understanding, ideation, interdisciplinary thinking, prototyping and solution development**.

ADCET has progressively promoted innovation and problem-solving through its institutional Hackathon initiative. The Hackathon is organized as an annual platform for encouraging students to identify contemporary challenges and develop innovative technology-driven solutions. During **Academic Year 2025–26, ADCET organized the third season of the Hackathon with Sustainable Development Goals (SDGs) as its central theme**.

The thematic orientation towards the SDGs provided students with a broad framework to explore challenges related to **agriculture, water and resource management, health and well-being, sustainable communities, transportation, safety, infrastructure, energy and responsible technological applications**.

Sustainability Challenge → Student Ideation → Technological Intervention → Prototype / Solution Concept → Potential Societal Contribution

The initiative was designed to encourage students to view the SDGs not merely as global development statements, but as a **framework for identifying real-world problems that can stimulate engineering and technological innovation**.

10.1 A Challenge-Driven Innovation Platform

The SDG-themed Hackathon encouraged student teams to identify or engage with problems having relevance to sustainable development and explore feasible solutions using their disciplinary and technological competencies.

The innovation process provided opportunities for students to:

- understand real-world environmental and societal challenges;
- identify specific problems within broader sustainability themes;
- apply engineering, computing and technological knowledge to solution development;
- engage in teamwork and interdisciplinary problem-solving;
- explore automation, sensing, data-driven systems and intelligent technologies for societal applications; and
- develop solution concepts and prototypes with potential for further technical refinement.

The Hackathon thus created an **immersive innovation environment** in which sustainability challenges served as triggers for student creativity and technological problem-solving.

10.2 Representative Sustainability-Oriented Innovation Ideas

The student ideas developed through the Hackathon reflected diverse sustainability and societal contexts. Representative innovation themes included:

Representative Innovation Idea	Challenge / Sustainability Context	Indicative SDG Relevance
Need-Based Irrigation and Pesticide Spray System	Identifying the extent of irrigation and pesticide requirement and enabling need-based application to improve resource efficiency in agriculture	SDG 2, SDG 6, SDG 12
Automatic Rail-Track Defect Monitoring System	Technology-enabled identification of rail-track defects to support safer and more resilient transportation infrastructure	SDG 9, SDG 11
Medicine Reminder System for Patients	Supporting timely medication and improving patient adherence through technology-enabled reminders	SDG 3
Automatic Tree-Planting System	Exploring automation for supporting plantation activities and environmental restoration efforts	SDG 13, SDG 15
Driver Condition and Sleepiness Recognition with Automatic Vehicle Stopping	Detecting driver drowsiness or unsafe physical condition and initiating preventive vehicle response to reduce accident risk	SDG 3, SDG 11

These representative ideas demonstrate the diversity of challenges explored by students and the potential of emerging technologies to support **resource efficiency, public health, infrastructure safety, environmental action and societal well-being**.

The significance of the ideas lies not only in the immediate prototype or solution concept, but also in the **student learning process of understanding a challenge and translating it into a technological intervention.**

10.3 Significance within ADCET's Sustainability Journey

The SDG Hackathon represents an important component of ADCET's evolving approach towards sustainable development because it provides a **deliberate challenge-driven platform for student innovation.**

Unlike retrospective mapping of an existing project to an SDG, the thematic orientation of the Hackathon encouraged students to engage with sustainable development **at the stage of problem identification and ideation.**

SDGs as a Challenge Framework → Problem Identification → Innovation → Engineering and Technological Response

This approach aligns closely with the emerging philosophy of the **ADCET EESD Faculty Toolkit**, particularly its emphasis on identifying authentic sustainability challenges before designing engineering interventions.

The Hackathon also demonstrates that sustainability-oriented innovation is not confined to conventional environmental themes. Students explored the application of **automation, sensing, artificial intelligence, monitoring systems and digital technologies** to challenges in agriculture, healthcare, transportation, environmental action and public safety.

The SDG Hackathon provided a platform where sustainable development challenges became opportunities for student creativity, interdisciplinary problem-solving and technology-enabled innovation.

As ADCET's institutional approach towards sustainability integration progresses, such challenge-driven innovation platforms provide opportunities to strengthen the connection between **student learning, emerging technologies, societal needs and sustainable development.**




Sant Dnyaneshwar Shikshan Sanstha's

**ANNASAHEB DANGE COLLEGE OF
ENGINEERING AND TECHNOLOGY, ASHTA**
(An Empowered Autonomous Institute)

Ashta | Dist. Sangli, Maharashtra 416 301 www.adcet.ac.in





Fostering innovation for a brighter tomorrow

HACKATHON

SEASON 3

Theme : Sustainable Development Goals (SDG's) - Vikasit Bharat - 2047

EXHIBITION / DEMONSTRATION

SOFTWARE & HARDWARE SECTION

14th March 2026, 11.00 AM onwards

Dr. Asma Shaikh Coordinator 9579489592	Dr. Amol Dange Dean, Research, Innovation and Startups	Dr. S. B. Hivarekar Dean, Faculty and Student Development	Dr. S. Gopinath Dean Academics	Dr. L. Y. Waghmode Director	Hon. V. R. Dange Joint Secretary (SDSS)	Hon. Adv. R. R. Dange Secretary (SDSS)
---	---	--	---	---------------------------------------	--	---

HACKATHONE: Season 3: theme: Sustainable Development Goals- Vikasit Bharat 2047



HACKATHON Season 3: SDGs, Vikasit Bharat

Part IV – Societal Engagement and Responsible Campus

11. Community Engagement for Sustainable Development

12. Sustainable Campus Practices

11. COMMUNITY ENGAGEMENT FOR SUSTAINABLE DEVELOPMENT

Extending Institutional Engagement beyond the Campus

Sustainable development requires educational institutions to engage not only with academic and technological challenges but also with the **social, environmental and developmental concerns of communities**. Community engagement provides opportunities for students and faculty members to understand local realities, interact with diverse stakeholders and develop greater awareness of the relationship between knowledge, professional responsibility and societal well-being.

At ADCET, community engagement is undertaken through **institutional outreach, NSS-led activities and discipline-specific academic interventions**. These initiatives have evolved through different institutional mechanisms and at different stages; however, several of them demonstrate meaningful relevance to the Sustainable Development Goals and contribute to awareness, health, environmental responsibility, social inclusion and community well-being.

Institutional Knowledge and Student Participation → Community Context → Engagement / Intervention → Awareness and Societal Contribution

The selected initiatives presented in this section demonstrate two complementary dimensions of ADCET's community engagement: **social and community-oriented action through NSS** and **technical outreach through the application of disciplinary knowledge**.

11.1 NSS-Led Community and Social Engagement

The **National Service Scheme (NSS)** provides an important platform for promoting social responsibility, community participation and awareness among students. Through diverse outreach initiatives, student volunteers engage with communities and contribute to areas related to **health, environmental awareness, social inclusion, civic responsibility and community well-being**.

An examination of NSS activities undertaken during the recent academic years identified several initiatives having meaningful relevance to sustainable development. Representative activities were selected based on their **nature of community engagement, societal relevance and relationship with specific SDG themes**.

Selected NSS Initiatives Relevant to Sustainable Development

Sr. No.	Initiative / Activity & Academic Year	Sustainability Focus / Challenge Addressed	Relevant SDG & Target	Outcome / Contribution towards SDG
1	Tree Plantation Drive in Collaboration with Forest Department — AY 2024–25	Conservation of terrestrial ecosystems, enhancement of green cover and environmental stewardship	SDG 15 – Target 15.1	Promoted environmental conservation and student participation in enhancement of green cover through a large-scale plantation initiative involving 360 students .
2	Awareness Programme for Farmers on Latest Technology in Farming — AY 2024–25	Need for improved agricultural knowledge, technology adoption and sustainable farming practices	SDG 2 – Target 2.4	Facilitated awareness among farmers regarding emerging agricultural technologies and promoted knowledge-based approaches towards resilient and sustainable farming practices.
3	Guest Lecture on Plastic Waste Management — AY 2024–25	Plastic waste generation and need for responsible waste reduction and management	SDG 12 – Target 12.5	Strengthened awareness regarding plastic waste management and promoted responsible waste reduction, recycling and environmentally conscious practices.
4	HB Testing Camp for Women — AY 2024–25	Women's health, preventive screening and awareness of hemoglobin-related health concerns	SDG 3 – Target 3.4	Extended preventive health screening to 733 women and promoted awareness regarding hemoglobin levels and women's health.
5	Awareness Programme on Disaster Management — AY 2024–25	Community preparedness and resilience towards disasters and emergency situations	SDG 11 – Target 11.5	Strengthened disaster awareness and preparedness among 271 participants , contributing to improved understanding of community resilience and emergency response.
6	Cleanliness Drive at Audumbar Temple Area and Krishna River Banks — AY 2024–25 & 2025–26	Public-space cleanliness, riverbank pollution and protection of the local aquatic environment	SDG 6 – Target 6.6; SDG 11 – Target 11.6	Promoted community participation in riverbank cleanliness and strengthened awareness regarding protection of the Krishna River environment and responsible waste practices.

7	Blood Donation Camps — AY 2024–25 & 2025–26	Community healthcare support and availability of blood for medical needs	SDG 3 – Target 3.8	Promoted voluntary blood donation among youth and strengthened community healthcare support through institutional blood donation initiatives conducted with recognized blood banks.
8	Guest Lecture on Promoting Solar Adoption — AY 2025–26	Transition towards renewable energy and awareness of clean-energy alternatives	SDG 7 – Target 7.2	Enhanced awareness regarding solar energy adoption and promoted understanding of renewable energy as a pathway towards sustainable energy transition.
9	Counselling Session and Street Play on World Suicide Prevention Day — AY 2025–26	Mental health, emotional well-being and suicide-prevention awareness among youth	SDG 3 – Target 3.4	Promoted mental-health awareness and suicide-prevention consciousness among 170 students through counselling and participatory communication.
10	Donation Drive for Flood-Affected People in Solapur — AY 2025–26	Vulnerability of disaster-affected communities and need for community-based humanitarian support	SDG 1 – Target 1.5	Mobilized 570 student participants in humanitarian support for flood-affected communities, promoting social responsibility and collective response to disaster-related vulnerability.
11	Constitution Day Celebration — AY 2024–25 & 2025–26	Constitutional awareness, inclusive citizenship, justice and accountable democratic institutions	SDG 16 – Targets 16.6 and 16.7	Strengthened constitutional awareness and responsible citizenship among students, promoting understanding of inclusive participation and democratic values.

The selected initiatives include activities related to **health and well-being, environmental awareness, cleanliness, social responsibility, community participation, blood donation and constitutional values**. Together, they reflect the broader social dimension of sustainable development and provide students with opportunities to engage with concerns extending beyond the conventional classroom environment.

The inclusion of activities such as **blood donation and Constitution Day observance** also reflects an important institutional understanding: sustainable development encompasses not only environmental concerns, but also **health, responsible citizenship, inclusive institutions, awareness of rights and duties, and social responsibility**.

NSS engagement enables students to experience sustainability through participation, service and interaction with society.

11.2 Discipline-Led Community and Outreach Interventions

Beyond general community engagement, academic departments at ADCET have also undertaken selected outreach activities in which **disciplinary knowledge and technical competencies are applied to real community or stakeholder contexts**.

Such initiatives are particularly significant from the perspective of engineering and professional education because they create a connection between:

Disciplinary Knowledge → Real Community Challenge → Technical Engagement → Evidence / Awareness → Societal Relevance

Based on the departmental data received, selected initiatives were examined carefully for their **depth of engagement, technical relevance and identifiable contribution towards sustainable development**. Only a limited number of activities with stronger disciplinary and community linkage were retained as representative institutional examples.

Selected Discipline-Led Community Interventions for Sustainable Development:

Sr. No.	Community Outreach Initiative & Department	Sustainability Challenge / Community Need Addressed	Relevant SDG & Target	Contribution towards Sustainable Development
1	Community Water Quality Assessment and Awareness through Village Water Testing Camps — Department of Civil Engineering	Need for assessment of drinking-water quality and improved awareness regarding safe water in nearby rural communities	SDG 6 – Target 6.1	Through four water-testing camps conducted in nearby villages , students and faculty applied Environmental Engineering knowledge to water sampling and quality assessment, supporting community understanding of drinking-water quality.
2	Food Adulteration Detection and Consumer Awareness Programme — Department of Food Technology	Health risks associated with food adulteration and limited public awareness regarding simple detection methods, food quality and informed consumption	SDG 3 – Target 3.9; SDG 12 – Target 12.8	Faculty and students demonstrated practical methods for detecting adulteration in commonly consumed food items and created awareness regarding food safety, food labelling, quality standards and responsible consumer choices.
3	Artificial Intelligence Awareness Programme for Secondary School Students — Department of Artificial Intelligence & Data Science	Need for early awareness and understanding of emerging digital technologies among school students	SDG 4 – Target 4.4	Extended knowledge of Artificial Intelligence to secondary-school students, providing early exposure to contemporary technological developments and enhancing awareness.

Among these initiatives, the **community water-testing camps conducted by the Department of Civil Engineering in four nearby villages** represent a particularly relevant example of discipline-led outreach. Students and faculty members applied knowledge related to water quality assessment in actual community settings, generated water-quality information and interacted with local stakeholders regarding drinking-water concerns.

The significance of such an intervention extends beyond the testing of water samples. It creates an opportunity for students to connect **environmental engineering knowledge, field investigation, data interpretation, public-health concerns and community interaction** within a real societal context.

Similarly, the other selected departmental initiatives demonstrate how disciplinary expertise can be extended beyond routine academic delivery and applied to relevant stakeholder and community needs.

11.3 Community Engagement as a Sustainability Learning Context:

ADCET recognizes that community engagement can provide an important **experiential and immersive learning environment**. Interaction with communities exposes students to the complexity of real-world challenges, where technical issues are often interconnected with awareness, behaviour, access to resources and local conditions.

The sustainability relevance of community engagement therefore lies not merely in conducting an outreach event, but in enabling students and faculty members to:

- understand local environmental and societal concerns;
- interact with communities and relevant stakeholders;
- apply disciplinary knowledge in real contexts;
- appreciate the human dimensions of engineering and technological decisions; and
- develop greater awareness of professional and societal responsibility.

The evolving institutional approach seeks to progressively encourage **meaningful, context-sensitive and discipline-relevant community engagement**, wherever appropriate.

Community engagement at ADCET reflects the extension of student participation and disciplinary knowledge towards real societal contexts—strengthening awareness, responsibility and the connection between education and sustainable development.



Guest Lecture on Plastic Waste Management



Tree Plantation Drive



Community Water Quality Assessment



Artificial Intelligence Awareness Programme for Secondary School Students

Food Adulteration Detection and Consumer Awareness Programme

12. SUSTAINABLE CAMPUS PRACTICES:

Translating Sustainability Perspectives into Responsible Institutional Practices

A higher education institution's engagement with sustainable development extends beyond curriculum, student projects and community outreach. The manner in which an institution manages its **energy, water, material resources, waste and campus environment** also reflects its approach towards responsible and sustainable development.

ADCET has progressively adopted a range of campus practices aimed at **resource conservation, efficient energy use, environmental stewardship, waste reduction and responsible campus behaviour**. These practices have evolved at different stages in response to institutional needs and environmental considerations and collectively contribute towards developing a more resource-conscious and environmentally responsible campus.

The institute also undertakes **Green Audit and Energy Audit** processes to examine environmental and energy-related aspects of campus operations. Such assessment mechanisms provide an important basis for understanding existing practices, identifying opportunities for improvement and strengthening institutional awareness regarding resource use and environmental performance.

Assessment → Responsible Resource Management → Campus Practices → Awareness → Progressive Improvement

The sustainable campus practices at ADCET may broadly be understood across the following dimensions.

12.1 Energy Conservation and Responsible Energy Use

Energy efficiency and the progressive use of cleaner energy sources are important components of responsible campus management. ADCET has adopted measures aimed at reducing conventional electricity dependence and improving energy-use efficiency.

The institute has installed a **100 kW solar power generation system**, contributing to the use of renewable energy within the campus. The solar installation represents an institutional step towards cleaner energy utilization and supports the broader direction of **SDG 7 – Affordable and Clean Energy** and **SDG 13 – Climate Action**.

The use of **LED lighting at various campus locations** further contributes to reducing electricity consumption through energy-efficient lighting technology. These measures, supported by energy-audit processes, reflect the institute's efforts towards more conscious and efficient energy utilisation.

Renewable Energy + Energy Efficiency → Responsible Energy Management

12.2 Water Conservation and Rainwater Management

Water conservation forms an important dimension of sustainable campus management. ADCET has established a **rainwater harvesting system** to facilitate the collection and management of rainwater within the campus.

The practice reflects the importance of conserving water resources and adopting appropriate measures for improved water management. Within the broader sustainability framework, such institutional practices reinforce the relevance of **responsible water use and resource conservation**, particularly in the context of **SDG 6 – Clean Water and Sanitation**.

The presence of water-conservation infrastructure within the campus also provides a visible context for promoting awareness of sustainable water management among students and faculty members.

12.3 Waste Reduction and Circular Resource Practices

Responsible use of materials and reduction of waste are essential elements of sustainable institutional operations. ADCET has adopted selected practices that encourage **resource recovery, recycling and beneficial utilisation of biodegradable material**.

A noteworthy practice is the **recycling of used student answer sheets through the Examination Section**. Used examination paper is channeled for recycling rather than being treated merely as disposable waste. This practice contributes towards responsible material management and reflects the principles of **waste reduction and circular resource use**.

The institute also undertakes **composting of tree litter and biodegradable campus biomass**. Fallen leaves and other suitable organic material generated from the green campus are utilised for composting, supporting the conversion of biodegradable waste into a useful resource.

These practices reflect a simple but important sustainability principle:

Reduce Waste → Recover Resources → Reuse Value

Such initiatives are relevant to the broader direction of **SDG 12 – Responsible Consumption and Production**.

12.4 Green Campus and Biodiversity Stewardship

ADCET's green campus forms an important component of its environmental setting. The presence and maintenance of **trees and vegetation across the campus** contribute to a healthier institutional environment and support local biodiversity. Green campus development contributes to shade, improved microclimatic conditions, visual and environmental quality and the protection of campus vegetation. The institute's approach towards maintaining its green environment reflects an understanding that institutional development should remain conscious of the **ecological character and environmental quality of the campus**. The green campus also supports the broader institutional direction towards reducing environmental impact and developing a campus culture that values **nature, biodiversity and environmental stewardship**.

A green campus is not merely a landscape feature; it is a visible expression of environmental responsibility.

12.5 Plastic Reduction and Responsible Campus Behaviour

Sustainable campus development also requires the participation and responsible behaviour of the campus community. ADCET promotes **plastic-free and plastic-reduction practices** as part of its efforts to minimize avoidable plastic use and strengthen environmental awareness.

The institute has also displayed **awareness and sensitization boards at key campus locations** to encourage responsible practices related to resource use, cleanliness and environmental consciousness.

Such measures may appear operationally simple; however, they contribute to creating a campus environment in which sustainability-related messages remain visible in day-to-day institutional life.

Infrastructure enables sustainability; awareness and responsible behaviour help sustain it.

12.6 Audits as Mechanisms for Environmental and Energy Review

The **Green Audit and Energy Audit** provide important review mechanisms for examining campus environmental and energy practices. The Green Audit supports assessment of relevant environmental aspects of the campus, while the Energy Audit provides insights into patterns of energy use and opportunities for improving energy performance. These processes contribute to a more systematic understanding of campus operations and provide a basis for identifying areas requiring attention or progressive improvement. The audits therefore complement the institute's operational practices by introducing an element of **assessment and review**.

Practice → Assessment → Identification of Opportunities → Progressive Improvement

ADCET views such audit mechanisms as important components of responsible institutional management rather than merely documentary exercises.

12.7 Sustainable Campus Practices at a Glance:

Sustainability Dimension	Key Institutional Practices	Broad Sustainability Contribution	Relevant SDGs
Environmental and Energy Review	Periodic Green Audit and Energy Audit	Assessment of environmental and energy performance, identification of improvement opportunities, and continual enhancement of campus sustainability practices	SDG 7, SDG 12, SDG 13
Renewable Energy and Energy Efficiency	100 kW rooftop solar power generation system , installation of an additional 178 kW solar PV system (awaiting commissioning), 16 solar-powered street lights , and progressive replacement of conventional tube lights with energy-efficient LED lighting	Increased adoption of renewable energy, reduction in carbon footprint, enhanced energy efficiency, and transition towards a low-carbon campus	SDG 7, SDG 13
Sustainable Green Mobility	Introduction of an 8-seater electric vehicle (EV) for in-campus transportation of visitors and institutional authorities	Promotion of clean mobility, reduction in fossil fuel consumption and greenhouse gas emissions, and encouragement of sustainable transportation practices	SDG 7, SDG 11, SDG 13

Water Conservation	Rainwater harvesting system	Water conservation, groundwater recharge, and responsible water resource management	SDG 6
Paper and Resource Recycling	Recycling of used student answer sheets through the Examination Section	Material recovery, paper recycling, waste minimisation, and efficient resource utilisation	SDG 12
Organic Waste Management	Composting of tree litter, leaf waste, and biodegradable campus biomass	Conversion of biodegradable waste into useful compost, resource recovery, and promotion of circular resource management	SDG 12, SDG 15
Green Campus and Biodiversity	Maintenance and expansion of trees, landscaped areas, gardens, and green campus environment	Conservation of biodiversity, carbon sequestration, environmental stewardship, and improvement of campus ecological quality	SDG 13, SDG 15
Plastic Reduction	Plastic-free and plastic-reduction initiatives across the campus	Reduction of single-use plastics, promotion of responsible consumption, and minimisation of plastic waste generation	SDG 12
Awareness and Responsible Behaviour	Sustainability awareness boards, environmental signages, and awareness initiatives at prominent campus locations	Continuous sensitisation of students, faculty, staff, and visitors towards environmentally responsible behaviour and sustainable lifestyles	SDG 12, SDG 13

12.8 Campus as a Living Context for Sustainability:

The sustainable campus practices of ADCET demonstrate the operational dimension of the institute's engagement with sustainable development. Renewable energy, energy efficiency, water conservation, recycling, composting, green campus stewardship and awareness practices provide **visible examples of sustainability principles within the institutional environment**.

These practices have evolved over time and are not presented as outcomes of the recently developed Institutional Policy for Sustainable Development. Rather, they represent **existing institutional practices that form an important part of ADCET's broader sustainability ecosystem**.

The evolving institutional framework now provides an opportunity to understand such practices more coherently, connect them with broader sustainability priorities and progressively strengthen mechanisms for assessment, awareness and improvement.

ADCET views the campus not only as a physical space for education, but also as a living context where responsible resource use, environmental stewardship and sustainability awareness can be visibly practiced.



100 KW Solar power generation



Green campus, ADCET

Part V – Institutional Culture, Integration and Way Forward

- 13. Building a Culture of Sustainable Development — Dnyanada**
- 14. ADCET Framework for Progressive Integration of Sustainable Development**
- 15. Progress, Emerging Outcomes and Institutional Learning**
- 16. Way Forward**
- 17. Concluding Note**

13. BUILDING A CULTURE OF SUSTAINABLE DEVELOPMENT THROUGH *DNYANADA*:

Encouraging Reflection, Expression and Multilingual Engagement with Sustainability

The integration of sustainable development within an educational institution extends beyond curriculum, projects and operational practices. Developing a broader culture of sustainability also requires opportunities for students and faculty members to **reflect, question, interpret and communicate their understanding of contemporary environmental and societal challenges**.

Recognising the importance of such academic and cultural engagement, the **2025–26 edition of ADCET's annual magazine, *Dnyanada*, adopted Sustainable Development as its central theme**. The thematic focus provided a common platform for students and faculty members to explore sustainable development through **technical, non-technical, social, cultural and creative perspectives**.

Awareness → Reflection → Expression → Dialogue → Sustainability Culture

The initiative encouraged contributors to view sustainability not merely as a technical or environmental concept, but as a multidimensional concern connected with **technology, society, resources, human well-being, responsible development and the future of communities**.

13.1 Technical and Non-Technical Perspectives on Sustainable Development:

A significant feature of *Dnyanada* was the inclusion of both **technical and non-technical sections** related to the broader theme of sustainable development.

Technical contributions provided opportunities to discuss engineering, science, technology and contemporary solutions relevant to sustainability challenges. At the same time, non-technical articles enabled contributors to examine sustainability from **social, behavioral, cultural and human perspectives**.

This combination reflects an important institutional understanding:

Sustainable development is not exclusively a technological challenge; it also requires awareness, values, responsible choices and societal participation.

By providing space for diverse forms of expression, *Dnyanada* helped broaden the sustainability dialogue beyond conventional disciplinary boundaries.

13.2 Multilingual Expression and Inclusive Sustainability Dialogue

One of the distinctive features of the 2025–26 edition was the inclusion of contributions in **multiple languages, including English, Marathi, Gujarati, Kannada and Sanskrit.**

The multilingual character of the magazine enabled students and faculty members to communicate ideas through languages and cultural contexts familiar to them. It also reinforced the understanding that sustainable development is a **shared societal concern whose relevance extends across linguistic, disciplinary and cultural boundaries.**

The use of diverse languages provided an inclusive platform for expression and brought different perspectives into the institutional sustainability discourse.

Different Languages → Diverse Perspectives → Shared Sustainability Concerns

This dimension is particularly meaningful because sustainability challenges are experienced within local and cultural contexts. The ability to discuss such concerns through multiple languages can support wider reflection, participation and connection with societal realities.

13.3 From Awareness to Institutional Sustainability Culture

The sustainability-themed edition of *Dnyanada* represents an important dimension of ADCET's evolving institutional journey. While curriculum and academic initiatives develop knowledge and competencies, platforms for communication and creative expression contribute to **awareness, reflection and institutional dialogue.**

The magazine provided students and faculty members with an opportunity to:

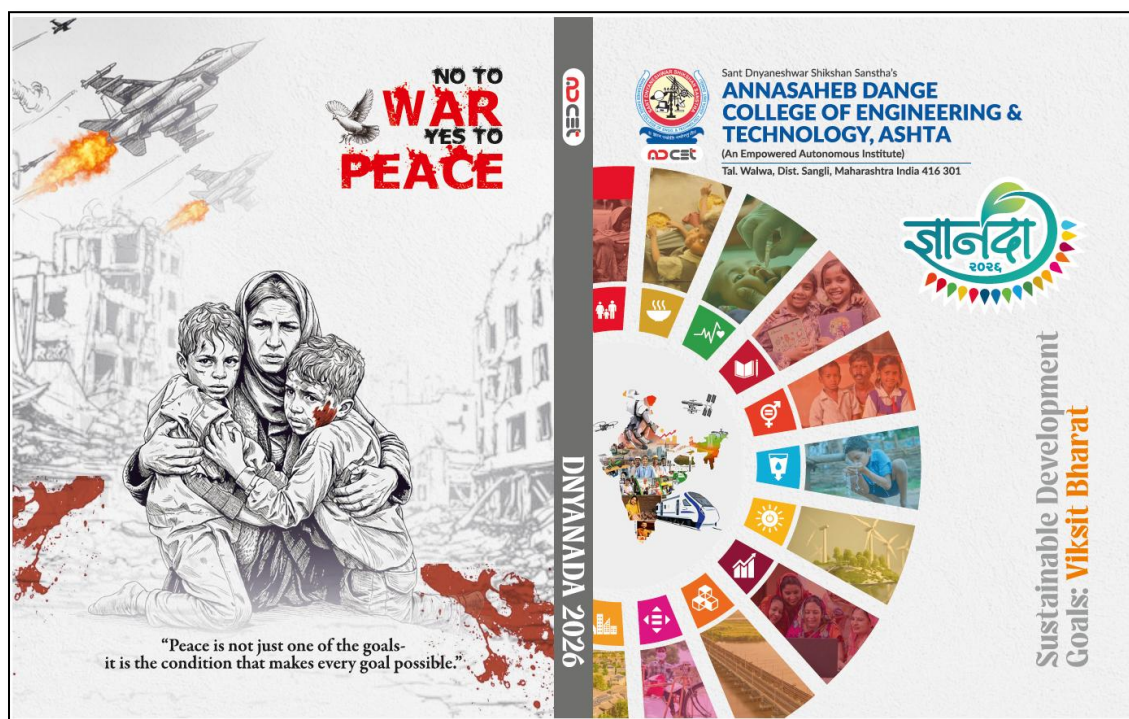
- explore sustainability-related themes beyond formal academic requirements;
- express technical and non-technical perspectives on sustainable development;
- communicate ideas through diverse linguistic and cultural contexts;

- reflect on the relationship between technology, society and responsible development; and
- participate in a broader institutional conversation on sustainability.

The initiative therefore complements ADCET's academic, innovation, community and campus practices by strengthening the **cultural and communicative dimension of sustainable development**.

Dnyanada transformed sustainable development from a theme to be studied into a subject to be reflected upon, interpreted and expressed across the ADCET community.

The thematic edition demonstrates ADCET's effort to progressively develop an institutional environment where sustainability is visible not only through policies, courses, projects and campus practices, but also through ideas, dialogue and creative expression.



14. ADCET FRAMEWORK FOR PROGRESSIVE INTEGRATION OF SUSTAINABLE DEVELOPMENT

Connecting Institutional Direction, Academic Capacity, Learning, Innovation and Responsible Action:

ADCET's engagement with sustainable development has progressively evolved across multiple academic and institutional dimensions. The initiatives presented in the preceding sections demonstrate contributions through **policy, faculty and student capacity development, teaching–learning, student projects and innovation, community engagement, responsible campus practices and institutional dialogue**. As these dimensions have developed, ADCET has recognized the importance of viewing them not as isolated activities, but as **interconnected components of an evolving sustainability ecosystem**.

The **ADCET Framework for Progressive Integration of Sustainable Development** therefore brings together the major dimensions of the institute's sustainability engagement within a common institutional perspective.

POLICY → CAPACITY → ACADEMIC INTEGRATION → APPLICATION → ENGAGEMENT → PRACTICE → CULTURE → EVIDENCE AND REVIEW

The framework reflects a progressive process in which **institutional direction enables capacity development; capacity supports academic integration; learning is applied through projects and innovation; disciplinary knowledge extends to societal contexts; institutional practices demonstrate responsible action; and evidence and review support progressive improvement**.

14.1 The Institutional Sustainability Integration Framework:

Framework Dimension	Institutional Role	Representative ADCET Mechanisms / Practices
POLICY – Institutional Direction	Provides a common institutional direction and broad framework for sustainability engagement	Institutional Policy for Sustainable Development
CAPACITY – Knowledge and Competency Development	Strengthens faculty and student understanding of sustainability challenges, contemporary knowledge and disciplinary opportunities	Faculty and student NPTEL learning; SDG CONNECT faculty capacity-building initiative

ACADEMIC INTEGRATION – Sustainability in Learning	Contextualizes sustainability within relevant curriculum, courses, teaching–learning and experiential activities	Mandatory Environmental Studies; SDG visibility in academic documentation; EESD course integration and sustainable learning experience tools
APPLICATION – Projects and Innovation	Enables students to apply disciplinary knowledge to real sustainability-related challenges	Mini, minor and capstone projects; Sustainable Project Design approach; SDG Hackathon
ENGAGEMENT – Community and Societal Context	Extends student participation and disciplinary knowledge towards community and societal concerns	NSS activities; discipline-led outreach; community water-testing camps
PRACTICE – Responsible Campus Operations	Demonstrates resource-conscious and environmentally responsible institutional practices	Solar power, LED lighting, rainwater harvesting, paper recycling, composting, green campus, plastic-reduction practices
CULTURE – Awareness, Reflection and Dialogue	Strengthens sustainability awareness and institutional discourse beyond formal academic processes	Sustainability-themed <i>Dnyanada</i> ; multilingual and multidisciplinary student and faculty expression
EVIDENCE AND REVIEW – Progressive Improvement	Supports documentation, reflection, assessment of emerging practices and further strengthening of institutional integration	Green and Energy Audits; academic evidence; EESD documentation; policy review and progressive institutional reflection

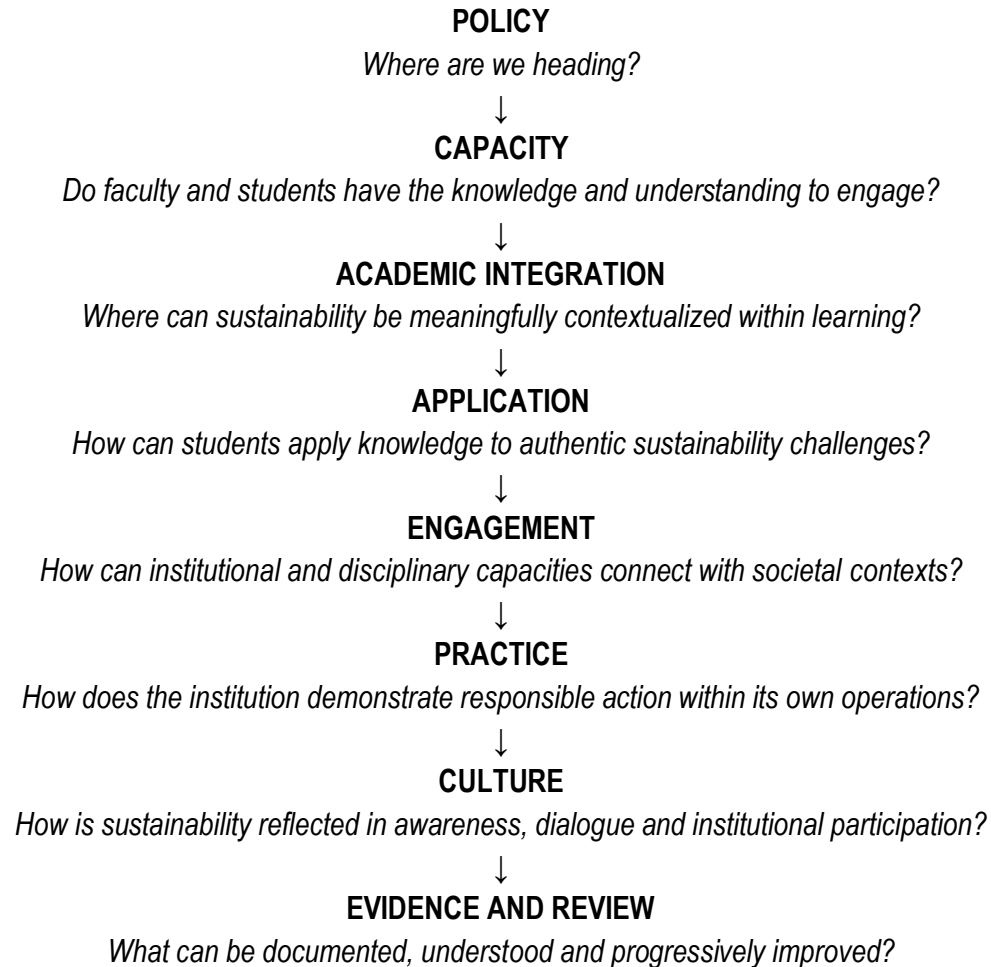
The framework recognises that these dimensions are **interdependent**. Sustainability integration cannot be strengthened through a single activity or institutional unit acting independently.

For example, faculty capacity development can influence course-level academic integration; meaningful learning experiences can generate student interest in sustainability-oriented projects; student projects can evolve into innovation opportunities; disciplinary expertise can extend to community contexts; and campus practices can provide visible examples of responsible resource management.

The strength of the framework lies in the connection between its dimensions rather than the number of activities within any single dimension.

14.2 From Institutional Direction to Responsible Action:

The ADCET framework may be understood as a progressive pathway:



This pathway does not imply that every sustainability initiative must necessarily pass through all eight dimensions in a fixed sequence. Rather, the framework provides a **common institutional lens for understanding how different initiatives contribute to the broader sustainability ecosystem of ADCET**.

14.3 A Progressive and Discipline-Sensitive Approach:

A central principle of the ADCET framework is that sustainability integration should remain **relevant to disciplinary and institutional context**.

The contribution of Civil Engineering may emerge through water, environmental quality, infrastructure and resilient communities. Electrical Engineering may engage through clean energy, smart grids and energy efficiency. Mechanical Engineering may contribute through sustainable manufacturing, thermal efficiency and resource productivity. Computing and Artificial Intelligence disciplines may address data-driven resource management, intelligent systems and technology-enabled societal solutions. Food Technology may contribute through food safety, sustainable food systems and resource-efficient processing.

Accordingly, ADCET does not seek to impose identical sustainability activities or SDG mappings across all programs.

Common Institutional Direction + Disciplinary Flexibility = Meaningful Sustainability Integration

The EESD methodology supports this approach by encouraging faculty members to begin with the **sustainability challenge and disciplinary context**, rather than beginning with an SDG number.

14.4 Towards Progressive Institutional Integration

The framework represents ADCET's **current understanding of its sustainability integration journey**. It brings together existing practices, recent institutional developments and emerging academic mechanisms within a coherent perspective.

ADCET recognises that the maturity of different framework dimensions may vary. Certain campus, community and academic practices have evolved over several years, while the Institutional Policy, SDG CONNECT and EESD Faculty Toolkit represent more recent developments aimed at strengthening **common understanding, academic contextualization and evidence-oriented integration**.

The framework is therefore not presented as a claim that sustainability has been fully integrated across every institutional process.

Rather, it provides a basis for:

- connecting existing sustainability-relevant practices;
- identifying opportunities for stronger academic integration;
- encouraging discipline-sensitive approaches;
- strengthening challenge-driven learning and innovation;
- improving documentation and evidence; and
- supporting periodic institutional reflection and progressive improvement.

ADCET's approach is to move progressively from awareness to understanding, from understanding to academic integration, and from integration to responsible and evidence-conscious action.

The **ADCET Framework for Progressive Integration of Sustainable Development** thus provides a common institutional lens for connecting **education, capacity, innovation, community engagement, responsible campus practices and institutional culture** in the broader pursuit of sustainable development.

15. PROGRESS, EMERGING OUTCOMES AND INSTITUTIONAL LEARNING

Learning from an Evolving Sustainability Integration Journey

ADCET's journey towards the integration of sustainable development has evolved progressively through **awareness, academic engagement, capacity development, institutional direction and structured academic application**. The initiatives and practices presented in this booklet reflect different stages of this journey and provide important insights into the manner in which sustainability can be meaningfully contextualised within an engineering and professional education institution.

The institute recognises that the development of a policy, conduct of a faculty capacity-building programme or preparation of an academic toolkit does not, by itself, represent complete sustainability integration. Meaningful institutional change develops progressively through **understanding, application, reflection, evidence and continuous improvement**.

At the present stage, ADCET has begun to observe important **emerging outcomes and institutional learning** that provide direction for further strengthening its sustainability engagement.

Experience → Reflection → Institutional Learning → Improved Approach → Progressive Integration

15.1 Emerging Outcomes

The progressive institutional journey has contributed to several identifiable developments.

- ✓ **Greater Visibility and Academic Awareness:** The Sustainable Development Goals have progressively gained greater visibility within academic processes and institutional discussions. Faculty and students are increasingly exposed to sustainability through **curriculum, professional learning, academic activities, projects, innovation and institutional initiatives**.
- ✓ **Movement towards a Common Understanding of SDG Integration:** The institutional approach has evolved from broad goal-level association towards a more structured understanding of sustainability challenges, SDG targets, indicator perspectives, academic interventions and evidence. **The SDG CONNECT initiative and the EESD Faculty Toolkit have provided a common academic language and methodology while retaining disciplinary flexibility.**

- ✓ **Development of a Formal Institutional Direction:** The approval of the Institutional Policy for Sustainable Development has provided an umbrella direction for connecting academic, capacity-building, innovation, community and campus dimensions of sustainability.
- ✓ The policy represents a transition from dispersed sustainability-relevant practices towards a more coherent institutional perspective.
- ✓ **Strengthening of Faculty Academic Capacity:** Faculty engagement with sustainability-relevant NPTEL courses, combined with the institute-wide hands-on SDG CONNECT initiative, has strengthened the academic base for sustainability contextualisation. The participation of approximately 159 faculty members in a common capacity-building exercise and the preparation of representative course-level samples across academic programs are important immediate outputs of this process.
- ✓ **Recognition of Sustainability within Student Learning and Projects:** The examination of student learning and project records has demonstrated that sustainability-relevant challenges are already being addressed through diverse disciplines. Projects related to water, energy, agriculture, food systems, waste, healthcare, infrastructure, safety and emerging technologies illustrate the potential of project-based learning to support sustainability-oriented problem-solving.
- ✓ **Greater Emphasis on Challenge-Driven Learning and Innovation:** The SDG-themed third season of the institutional Hackathon and the Sustainable Project Design approach within the EESD Toolkit reflect a growing emphasis on beginning with authentic challenges and developing context-relevant engineering or technological interventions.
- ✓ **Recognition of Sustainability as a Multidimensional Institutional Concern:** The collective evidence presented in this booklet demonstrates that sustainable development at ADCET extends beyond environmental themes. It encompasses education, health, energy, water, food systems, technology, infrastructure, resource management, community well-being, institutional responsibility and cultural dialogue.

15.2 Key Institutional Learning:

The journey has also generated several important institutional learnings.

1. Visibility is an Important Starting Point, but Integration Requires Deeper Understanding: The initial visibility of the 17 SDGs within academic documentation helped create awareness and initiate faculty reflection. As engagement increased, the need for a deeper understanding of **SDG targets, indicators and disciplinary contexts** became evident.

ADCET has therefore learned that awareness is essential, but meaningful integration requires an academic methodology.

2. Sustainability Integration Should Begin with the Challenge, Not the SDG Number: One of the most important learnings emerging from the institutional process is that sustainability contextualisation becomes more meaningful when faculty and students first identify the **real environmental, societal, technological or resource-related challenge**.

Challenge First → Context Next → Relevant Target → Intervention → Evidence

This approach helps reduce artificial mapping and strengthens the academic relevance of sustainability integration.

3. A Common Methodology Should Support, Not Replace, Disciplinary Flexibility: Different academic programs contribute to sustainable development through different professional contexts. A single prescribed set of sustainability activities would therefore be inappropriate.

ADCET's experience indicates that institutions require a **common language and academic methodology**, while allowing disciplines to identify their own relevant sustainability challenges and interventions.

4. Existing Academic Practices Often Contain Significant Sustainability Potential: The review of courses, learning activities and student projects demonstrated that several existing academic practices already engage with authentic sustainability challenges.

The requirement is not always to introduce a completely new activity or course. In many cases, the opportunity lies in making the sustainability context **more visible, purposeful, academically connected and evidence-based**.

5. Faculty Capacity is Central to Academic Integration: Faculty members play a critical role in curriculum interpretation, learning design, project mentoring and student engagement.

The institutional journey has reinforced that policy direction must be supported by **faculty understanding, disciplinary knowledge and practical academic tools**.

6. Evidence Strengthens the Quality of Sustainability Integration: Mapping an activity or project with an SDG is only the beginning. The institute has recognised the importance of identifying **what students learned, what intervention was undertaken and what evidence is available to demonstrate engagement or contribution**.

This understanding has influenced the evidence-conscious approach of the EESD methodology.

7. Sustainability Integration is a Progressive Process: Perhaps the most significant institutional learning is that sustainability integration cannot be treated as a one-time exercise.

Awareness → Understanding → Application → Evidence → Reflection → Improvement

ADCET therefore views sustainability integration as an **evolving institutional and educational process requiring periodic reflection and progressive strengthening.**

15.3 Current Institutional Position

At the present stage of its journey, ADCET has developed:

- an **approved Institutional Policy for Sustainable Development**;
- a progressively developing faculty and student knowledge base in sustainability-relevant domains;
- a common academic understanding strengthened through **SDG CONNECT**, with approximately 125 faculty participants;
- a structured **EESD Faculty Toolkit** for course integration, sustainable learning experiences, project design and departmental planning;
- representative program-wise course-level sustainability integration exercises;
- a diverse portfolio of sustainability-relevant student projects and challenge-driven innovation;
- community and discipline-led outreach initiatives;
- established sustainable campus practices and environmental review mechanisms; and
- Institutional platforms supporting sustainability awareness, reflection and dialogue.

These developments provide a **foundation for the next stage of ADCET's sustainability integration journey.**

The institute does not view the present stage as an endpoint. Rather, it represents a transition towards **more deliberate academic integration, stronger challenge-driven learning, improved evidence generation and periodic institutional review. ADCET's most significant progress is not merely the increase in sustainability-related activities, but the development of a clearer institutional understanding of how sustainability can be progressively integrated, contextualized and evidenced within education and institutional practice.**

16. WAY FORWARD:

ADCET recognises that the integration of sustainable development within engineering and professional education is a **progressive and evolving process**. The institutional journey so far has created greater awareness, strengthened academic understanding, established a common policy direction and developed practical mechanisms for sustainability contextualization.

Building on this foundation, ADCET intends to progressively focus on:

- strengthening **course-level sustainability integration** in relevant academic contexts;
- promoting **experiential and immersive learning** around authentic sustainability challenges;
- encouraging **challenge-driven formulation of selected student projects and innovations**;
- supporting discipline-specific sustainability perspectives while maintaining a common institutional direction;
- strengthening **evidence-oriented documentation of student learning and sustainability engagement**; and
- periodically reviewing emerging practices and identifying opportunities for further improvement.

The emphasis will remain on **meaningful and context-sensitive integration rather than numerical or artificial SDG mapping**.

The way forward is to progressively move from understanding sustainability to purposefully embedding it within relevant learning, innovation and institutional practices.

17. CONCLUDING NOTE:

ADCET's engagement with sustainable development reflects an evolving institutional journey—from **awareness and academic visibility towards common understanding, institutional direction, capacity development and structured academic integration**.

The initiatives presented in this booklet demonstrate the diverse ways in which sustainability is progressively reflected through **faculty and student learning, teaching–learning practices, student projects and innovation, community engagement, responsible campus practices and institutional dialogue**.

The development of the **Institutional Policy for Sustainable Development, SDG CONNECT and the ADCET EESD Faculty Toolkit** represents an important step towards bringing greater coherence and academic purpose to this journey.

ADCET recognises that sustainable development is not a destination achieved through a single policy, programme or activity. It requires **continuous learning, contextual understanding, responsible application, evidence and progressive improvement**.

Awareness → Understanding → Competency → Innovation → Responsible Action → Sustainable Development

With this perspective, ADCET remains committed to strengthening an educational ecosystem that enables students and faculty members to **understand contemporary sustainability challenges, apply disciplinary knowledge responsibly and contribute meaningfully to a more sustainable future**.



**Annasaheb Dange College of Engineering and Technology,
Ashta, Tal. Walwa, Dist. Sangli, MS, 416301**

An empowered autonomous institute affiliated with Shivaji University, Kolhapur.
[Accredited by NAAC with A++, Cycle Second]



Date: 26/03/2026

Policy on Education for Sustainable Development (ESD)
(Integrating Sustainability into Education, Research, Innovation and Institutional Practices)

1. Preamble:

Annasaheb Dange College of Engineering and Technology (ADCET), Ashta, recognizes that higher education institutions have a significant responsibility in preparing graduates capable of addressing contemporary environmental, social and economic challenges through knowledge, innovation and responsible professional practice.

Aligned with the United Nations Sustainable Development Goals (SDGs), the National Education Policy (NEP) 2020, the principles of Outcome-Based Education (OBE), and the vision of sustainable institutional development, ADCET is committed to integrating Education for Sustainable Development (ESD) across its academic ecosystem and institutional practices.

The Institute believes that sustainability is not an additional academic requirement but an integral dimension of teaching-learning, research, innovation, campus development, governance and community engagement. Sustainability principles shall therefore be embedded into institutional planning, academic processes and operational practices to create responsible professionals capable of contributing to a sustainable and resilient society.

2. Policy Statement

ADCET is committed to embedding the principles of Education for Sustainable Development (ESD) across its academic programmes, research, innovation, institutional governance, campus operations and community engagement.

The Institute shall promote responsible education, sustainable resource management, innovation-driven solutions and environmental stewardship so that sustainability becomes an integral component of institutional culture and continuous quality enhancement.

3. Objectives

This policy aims to:



- Integrate sustainability principles into academic programmes wherever appropriate.
- Promote interdisciplinary learning, systems thinking and experiential learning.
- Encourage sustainability-oriented research, innovation, consultancy and entrepreneurship.
- Strengthen community engagement through technology-enabled and socially relevant interventions.
- Foster responsible utilisation of natural resources and environmentally sustainable campus practices.
- Promote renewable energy adoption and efficient resource management.
- Build institutional capacity through faculty development and stakeholder participation.
- Contribute towards achieving relevant Sustainable Development Goals through education, research, innovation and outreach.
- Promote continual improvement in institutional sustainability performance through periodic assessment and review.

4. Scope

This policy applies to all academic programmes, departments, faculty members, staff, students, administrative units and institutional activities of Annasaheb Dange College of Engineering and Technology (ADCET), Ashta.

5. Institutional Framework for Implementation

To achieve the objectives of this policy, ADCET shall promote sustainability through the following institutional initiatives.

5.1 Academic Programmes

The Institute shall encourage academic departments to:

- Integrate relevant sustainability concepts into curriculum design, revision and delivery wherever appropriate.
- Incorporate SDG perspectives into suitable courses and learning activities.
- Promote interdisciplinary, experiential and project-based learning.
- Encourage sustainability-oriented case studies, laboratory work, field activities and design projects.
- Promote value-based education that develops ethical and environmentally responsible professionals.

5.2 Research, Innovation and Entrepreneurship

The Institute shall:

- Encourage research addressing environmental, social and economic sustainability challenges.
- Promote interdisciplinary research and innovation.
- Support consultancy, patents, technology development and entrepreneurship contributing towards sustainable development.
- Encourage student innovation, hackathons and problem-solving initiatives aligned with sustainability.



5.3 Community Engagement

The Institute shall:

- Promote extension activities addressing local and regional sustainability challenges.
- Encourage application of academic knowledge for community development.
- Undertake awareness programmes related to environmental conservation, water management, waste management, renewable energy and climate action.
- Strengthen collaborations with industries, government agencies, professional bodies and civil society organizations for sustainable development.

5.4 Sustainable Campus

ADCET shall continue to strengthen sustainable campus management through:

- Energy conservation and efficient utilization of energy resources.
- Promotion of renewable energy technologies.
- Water conservation and responsible utilization of natural resources.
- Scientific waste management following the principles of Reduce, Reuse and Recycle.
- Green campus initiatives including biodiversity conservation and enhancement of green cover.
- Digital governance for minimizing paper consumption and improving resource efficiency.
- Promotion of sustainable transportation and environmentally responsible campus practices wherever feasible.
- Conducting Green Audits ordinarily once every two years to assess environmental performance and identify opportunities for continual improvement.
- Conducting Energy Audits ordinarily once every three to five years to evaluate energy utilization, improve energy efficiency and strengthen institutional energy management practices.
- Implementing feasible recommendations emerging from sustainability assessments and institutional audits.

5.5 Faculty Capacity Building

The Institute shall promote continuous professional development through:

- Faculty Development Programmes.
- Workshops and seminars.
- Collaborative learning initiatives.
- Training programmes related to sustainability and emerging technologies.
- Participation in professional bodies and national or international sustainability initiatives.

The reference booklet encompassing the detailed information and formats will be prepared and provided in A.Y. 2026-2027.



6. Roles and Responsibilities

Institute

The Institute shall:

- Provide strategic direction for implementation of Education for Sustainable Development.
- Integrate sustainability into institutional planning and quality assurance.
- Facilitate interdisciplinary collaboration and partnerships.
- Promote faculty development.
- Encourage sustainability-oriented research and innovation.
- Support community engagement.
- Allocate resources for implementation of sustainability initiatives.
- Recognize and disseminate institutional best practices.

Academic Departments

Academic Departments shall:

- Identify sustainability opportunities relevant to their disciplines.
- Integrate SDG perspectives into curriculum and academic activities wherever appropriate.
- Encourage interdisciplinary learning and collaborative projects.
- Promote sustainability-oriented research, consultancy, innovation and outreach.
- Document departmental sustainability initiatives for continuous improvement.

Faculty Members

Faculty members shall:

- Integrate sustainability concepts into relevant courses.
- Design meaningful learning experiences addressing sustainability challenges.
- Encourage student participation in projects, research, innovation and extension activities.
- Contribute towards institutional sustainability initiatives.
- Participate in continuous professional development related to sustainability.

Students

Students are encouraged to:

- Participate actively in sustainability-related academic and extracurricular activities.
- Undertake projects addressing societal and environmental challenges.
- Practice responsible utilization of resources.
- Contribute to green campus and community initiatives.



7. Institutional Review and Continuous Improvement

ADCET recognizes that Education for Sustainable Development is a continuous process of institutional learning and improvement. Implementation of this policy shall be reviewed periodically through the Institute's established academic and quality assurance mechanisms. The Institute shall also review the findings and recommendations emerging from Green Audits, Energy Audits and other sustainability assessments. Wherever feasible, these recommendations shall be incorporated into institutional planning and continuous quality improvement initiatives.

This policy shall ordinarily be reviewed every **three years** to ensure its continued relevance and effectiveness. A review may also be undertaken earlier in response to significant changes in statutory regulations, national policies, accreditation requirements, institutional priorities or global sustainability frameworks.

8. Expected Outcomes

Implementation of this policy is expected to:

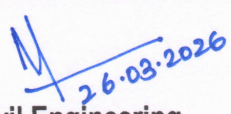
- Foster a culture of sustainability across the Institute.
- Develop graduates capable of addressing environmental, social and economic challenges.
- Strengthen interdisciplinary learning and responsible innovation.
- Improve environmental performance through efficient resource utilization.
- Enhance adoption of renewable energy and sustainable campus practices.
- Promote meaningful community engagement.
- Strengthen institutional contribution towards Sustainable Development Goals.
- Support continuous quality enhancement aligned with national and international educational frameworks.

9. Institutional Declaration

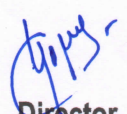
Annasaheb Dange College of Engineering and Technology (ADCET), Ashta, affirms that sustainability is a shared institutional responsibility and an essential component of academic excellence, responsible governance and societal development.

The Institute is committed to integrating the principles of Education for Sustainable Development across its teaching-learning processes, research, innovation, community engagement and institutional operations. Through responsible leadership, stakeholder participation and continual improvement, ADCET shall strive to create an environmentally responsible, socially inclusive and economically sustainable institutional ecosystem.

By adopting this policy, the Institute reaffirms its commitment to nurturing competent professionals who combine technical excellence with ethical values, environmental stewardship, innovation and social responsibility, thereby contributing meaningfully towards a sustainable, resilient and inclusive society.


HoD, Civil Engineering




Director



ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY, ASHTA

(An Empowered Autonomous Institute, Affiliated to Shivaji University, Kolhapur, Approved By AICTE, New Delhi & Govt. of Maharashtra, Accredited by NAAC 'A++' Grade, Bangalore)

Department of

EESD Faculty Toolkit

Engineering Education for Sustainable Development

A Practical Toolkit for Integrating Sustainability into Engineering Education

Introduction:

This toolkit supports engineering faculty in integrating sustainability into curriculum, teaching-learning, projects and departmental planning. It aligns with NEP 2020, OBE, NBA expectations and the SDGs.

Five EESD Tools

Tool	Purpose	Outcome
Tool 1: Sustainability Lens	Identify sustainability opportunities.	Opportunities identified
Tool 2: Course Sustainability Integration	Plan integration into course.	Course integration plan
Tool 3: Sustainable Learning Experience	Design one sustainability activity.	Activity ready
Tool 4: Sustainable Project Design	Develop sustainability projects.	Project concept
Tool 5: Department Action Planning	Prepare departmental roadmap.	Action plan



ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY, ASHTA

(An Empowered Autonomous Institute, Affiliated to Shivaji University, Kolhapur, Approved By AICTE, New Delhi & Govt. of Maharashtra, Accredited by NAAC 'A++' Grade, Bangalore)

Department of

Tool 1 – Sustainability Lens Tool

Purpose

Identify sustainability opportunities before mapping SDGs.

When to Use

Curriculum review and course planning.

Key Components

- Course Information
- Contribution Type (Direct/Indirect/Enabling)
- Sustainability Challenges
- Engineering Opportunities
- Learning Opportunities
- Graduate Competencies
- Reflection

Working Space



ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY, ASHTA

(An Empowered Autonomous Institute, Affiliated to Shivaji University, Kolhapur, Approved By AICTE, New Delhi & Govt. of Maharashtra, Accredited by NAAC 'A++' Grade, Bangalore)

Department of

Tool 2 – Course Sustainability Integration Tool

Purpose

Plan sustainability integration into an engineering course.

When to Use

Course planning and curriculum revision.

Key Components

- Course Profile
- COs & Opportunities
- Module-wise Integration
- Teaching Strategies
- Learning Activities
- Assessment
- Graduate Competencies
- SDG Alignment
- Evidence

Working Space



ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY, ASHTA

(An Empowered Autonomous Institute, Affiliated to Shivaji University, Kolhapur, Approved By AICTE, New Delhi & Govt. of Maharashtra, Accredited by NAAC 'A++' Grade, Bangalore)

Department of

Tool 3 – Sustainable Learning Experience Tool

Purpose

Design one sustainability-focused learning experience.

When to Use

Assignments, labs, projects, field visits and case studies.

Key Components

- Activity Profile
- Learning Activity Type
- Sustainability Challenge
- Student Tasks
- Competencies
- Assessment
- Evidence
- SDG Alignment
- Reflection

Working Space



ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY, ASHTA

(An Empowered Autonomous Institute, Affiliated to Shivaji University, Kolhapur, Approved By AICTE, New Delhi & Govt. of Maharashtra, Accredited by NAAC 'A++' Grade, Bangalore)

Department of

Tool 4 – Sustainable Project Design Tool

Purpose

Design sustainability-oriented student projects.

When to Use

Mini/Major Projects, Innovation and Research.

Key Components

- Project Information
- Challenge
- Engineering Solution
- Expected Outcomes
- Competencies
- Expected Impact
- Evidence
- Relevant SDGs

Working Space



ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY, ASHTA

(An Empowered Autonomous Institute, Affiliated to Shivaji University, Kolhapur, Approved By AICTE, New Delhi & Govt. of Maharashtra, Accredited by NAAC 'A++' Grade, Bangalore)

Department of

Tool 5 – Department Sustainability Action Planning Tool

Purpose

Develop a departmental implementation roadmap.

When to Use

Department planning, IQAC, NBA and NAAC.

Key Components

- Department Information
- Current Strengths
- Priority Areas
- Action Plan
- Expected Outcomes
- Success Indicators
- Commitment

Working Space

ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY, ASHTA

Department of Civil Engineering

**ADCET EESD FACULTY TOOLKIT
COURSE-LEVEL WORKED EXAMPLE**

Tool 2: Course Sustainability Integration Tool
&

Tool 3: Sustainable Learning Experience Tool

Environmental Engineering (2CVPC315)
TY B.Tech. Civil Engineering | Semester VI | AY 2025–26

Course Coordinator: Dr. Manoj H. Mota

TOOL 2 – COURSE SUSTAINABILITY INTEGRATION TOOL

Purpose: To identify and document meaningful sustainability integration already embedded in the course and connect course outcomes, content, learning experiences, assessment and SDG targets.

Course Profile	Details
Course Code & Title	2CVPC315 – Environmental Engineering
Programme / Semester	B.Tech. Civil Engineering / TY / Semester VI
Academic Year	2025–26
Course Coordinator	Dr. Manoj H. Mota
Credits / Teaching Scheme	04 Credits / 03-02-00
Contribution Type	Direct contribution to Sustainable Development

A. Course Outcomes and Sustainability Opportunities:

CO	Existing Course Outcome	Sustainability Opportunity	SDG(s)	Target(s)
CO1	Apply fundamentals of water treatment to estimate capacities for water supply systems.	Safe and adequate water supply; demand and source sustainability.	6	6.1, 6.4
CO2	Design components of WTP and distribution system referring standard parameters.	Safe treatment infrastructure, resilient water services and efficient distribution.	6, 9	6.1, 6.4, 9.1
CO3	Apply wastewater engineering fundamentals to design sewerage-system components.	Safe sanitation, wastewater collection and prevention of contamination.	6, 11	6.2, 6.3, 11.6
CO4	Identify conventional and low-cost wastewater treatment processes considering characteristics.	Affordable, appropriate and resource-conscious wastewater treatment.	6, 12	6.3, 12.2
CO5	Use rules, regulations and strategies to control water pollution.	Pollution prevention, compliance and protection of water ecosystems.	6	6.3, 6.6
CO6	Professionally comment on water quality and suggest treatment using physico-chemical tests.	Evidence-based water-quality decisions, public health and community awareness.	3, 6	3.9, 6.1, 6.3, 6.b

B. Module-wise Sustainability Integration:

Unit	Existing Content	Sustainability Integration Lens	Targets
1 – Fundamentals of Water Treatment	Sources, source selection, sustainability, water quality, population and demand.	Water security, equitable access, responsible abstraction and efficient water use.	6.1, 6.4
2 – Water Treatment Processes	Treatment philosophy; aeration, coagulation, sedimentation, filtration, disinfection and membranes.	Safe drinking water, process efficiency, treatment selection and public-health protection.	3.9, 6.1, 6.3
3 – Water Distribution Systems	Networks, pumps, storage, water losses, leakage detection and loss reduction.	Efficient water use, reduction of water losses and resilient infrastructure.	6.4, 9.1
4 – Wastewater Engineering	Wastewater estimation, sewerage systems and sewer design.	Safe sanitation, collection and reduction of untreated discharge.	6.2, 6.3, 11.6
5 – Wastewater Treatment	Primary, biological and low-cost treatment; wetlands, ponds, RBC and septic tank.	Improved water quality and context-sensitive, resource-efficient treatment.	6.3, 12.2
6 – Disposal of Wastewater	Effluent standards, self-purification, DO sag, stream classification and WQI.	Pollution control, ecosystem protection and evidence-based decisions.	6.3, 6.6

C. Teaching–Learning and Sustainability Learning Experiences:

Learning Experience	Nature	Competencies Developed	Evidence
Assessment of Water Quality from WTP	Field/experimental investigation	Problem analysis, data analysis, investigation, engineering judgement, teamwork, ethics, communication and sustainability awareness.	Sampling/testing data, analysis, WTP evaluation and technical report
Assessment of Stream Pollution	Field investigation and environmental monitoring	Systems thinking, problem identification, regulatory understanding, environmental monitoring, teamwork, ethics and reporting.	Field observations, test data, pollution-source analysis and report
Water Testing Camp	Community-based experiential learning and outreach	Public-health awareness, community engagement, tool usage, communication, leadership, data interpretation and social responsibility.	Camp records, test results, interpretation, community communication and report

D. Assessment Integration:

Assessment Event	Assessment Focus	Sustainability Evidence
ISE 1 – WTP Water Quality Assessment	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9	Water-quality interpretation and process-specific treatment/performance recommendations
ISE 2 – Stream Pollution Assessment	PO1, PO2, PO4, PO6, PO7, PO8, PO9	Pollution assessment linked with health, environment, sustainability and regulations
Water Testing Camp	PO1, PO2, PO4, PO5, PO6, PO7, PO8, PO9	Community-facing water-quality assessment and responsible communication

E. Graduate Competencies / Attributes Strengthened:

Engineering knowledge • Problem analysis • Design/development of solutions • Investigation of complex problems • Engineering tool usage • Engineer and society • Ethics • Individual and team work • Communication • Systems thinking • Sustainability awareness • Social responsibility

F. Course-level SDG Alignment Summary:

Priority SDG	Course Contribution	Key Targets
SDG 6 – Clean Water and Sanitation	Core contribution through water supply, treatment, sanitation, wastewater treatment, pollution control and community water-quality assessment.	6.1, 6.2, 6.3, 6.4, 6.6, 6.b
SDG 3 – Good Health and Well-being	Public-health protection through safe water assessment, treatment and pollution-risk interpretation.	3.9
SDG 9 – Industry, Innovation and Infrastructure	Reliable water-treatment and distribution infrastructure.	9.1
SDG 11 – Sustainable Cities and Communities	Water and sanitation services and reduction of environmental impact from wastewater.	11.6
SDG 12 – Responsible Consumption and Production	Resource-conscious treatment selection and efficient resource use.	12.2
SDG 4 – Quality Education	Experiential, field-based and community-connected sustainability learning.	4.7

Course-level conclusion: Environmental Engineering already demonstrates strong and direct sustainability integration. The opportunity is not to add a separate SDG component, but to explicitly document the existing connection between technical learning, real water and wastewater challenges, graduate competencies, assessment evidence and relevant SDG targets.

TOOL 3 – SUSTAINABLE LEARNING EXPERIENCE TOOL:

Purpose: To design and document a sustainability-focused learning experience by connecting a real societal challenge with engineering learning, student action, competency development, assessment and evidence.

Learning Experience 1 – Assessment of Water Quality from Water Treatment Plant (WTP)

Activity Profile	Details
Activity Type	Field-based experimental investigation / ISE activity
COs Assessed	2CVPC315_1 and 2CVPC315_6

1. Sustainability / Societal Challenge: Water treatment plants must consistently produce safe water despite variations in source-water quality and operational conditions. Students need to connect water-quality data with treatment processes and public-health requirements.

2. Student Tasks: Visit/assess a WTP; identify relevant parameters; plan sampling and testing; analyse results; relate observed quality to treatment units; evaluate WTP performance; and recommend technically feasible, process-specific improvements (if needed).

3. Engineering Concepts Applied: Water-quality parameters; treatment philosophy; unit processes; aeration; coagulation/flocculation; sedimentation; filtration; disinfection; standards and treatment selection.

4. Competencies Developed: Problem analysis, critical thinking, data analysis, experimental investigation, engineering judgement, teamwork, technical communication, ethical responsibility and sustainability awareness.

5. Evidence Generated: Sampling/testing records; laboratory data; parameter interpretation; WTP evaluation; improvement recommendations; technical report and oral explanation.

6. SDG Alignment: SDG 3 – Target 3.9; SDG 6 – Targets 6.1 and 6.3; SDG 4 – Target 4.7

7. Reflection – Why is this an EESD Learning Experience? The activity converts conventional water-quality testing into a real-system performance investigation. Sustainability is demonstrated when students justify treatment decisions in relation to safe water, public health and responsible professional judgement.

Learning Experience 2 – Assessment of Stream Pollution (Selected Stream/River)

Activity Profile	Details
Activity Type	Field investigation / environmental monitoring / ISE activity
COs Assessed	2CVPC315_5 and 2CVPC315_6

1. Sustainability / Societal Challenge: Surface-water pollution is a complex problem involving pollutant sources, water quality, ecosystem impacts, public health and regulatory requirements.

2. Student Tasks: Select a stream/river reach; identify possible pollution sources; plan field sampling; conduct relevant tests; analyse trends; interpret results using standards, regulations and stream-pollution concepts; identify issues; and recommend control strategies.

3. Engineering Concepts Applied: Stream pollution; effluent standards; self-purification; DO sag; Streeter–Phelps concept; stream classification; WQI; environmental rules and pollution-control strategies.

4. Competencies Developed: Field investigation, environmental monitoring, data analysis, critical thinking, problem identification, systems thinking, regulatory understanding, teamwork, ethics and technical reporting.

5. Evidence Generated: Field plan and observations; sampling/testing data; pollution-source identification; data analysis; regulatory interpretation; figures/tables; conclusions and technical report.

6. SDG Alignment: SDG 6 – Targets 6.3 and 6.6; SDG 3 – Target 3.9; SDG 4 – Target 4.7

7. Reflection – Why is this an EESD Learning Experience? The experience develops systems thinking by linking pollution sources, field evidence, regulation, environmental impact and control strategies. The SDG connection emerges from the engineering investigation itself.

Learning Experience 3 – Water Testing Camp:

Activity Profile	Details
Activity Type	Community-based experiential learning / laboratory outreach
CO Assessed	2CVPC315_6

1. Sustainability / Societal Challenge: Communities require understandable and technically sound information about water quality. Engineers must test samples, interpret results responsibly and communicate significance to non-technical stakeholders.

2. Student Tasks: Plan and conduct a water testing camp; handle representative samples; test using appropriate instruments and methods; interpret results against drinking-water requirements; identify concerns; suggest treatment/precautions; and communicate findings responsibly.

3. Engineering Concepts Applied: Physico-chemical water-quality testing; sample handling; instrument use; result interpretation; drinking-water standards; treatment selection; public-health significance and professional communication.

4. Competencies Developed: Applied water-quality testing, community engagement, public-health awareness, professional communication, ethical practice, teamwork, leadership, data interpretation, engineering tool usage, regulatory understanding and social responsibility.

5. Assessment Approach: Five-level competency rubric covering PO1, PO2, PO4, PO5, PO6, PO7, PO8 and PO9.

6. Evidence Generated: Camp planning and participation records; sample/test records; instrument-use observations; interpreted results; treatment/precaution suggestions; community communication; photographs and technical report.

7. SDG Alignment: SDG 6 – Targets 6.1, 6.3 and 6.b; SDG 3 – Target 3.9; SDG 4 – Target 4.7

8. Reflection – Why is this an EESD Learning Experience? This activity moves learning from the laboratory to society. Students demonstrate professional competence by generating reliable data, recognizing limitations, protecting integrity in reporting and communicating water-quality implications appropriately.