NATIONAL BOARD OF ACCREDITATION

Data Capturing Points of the Program Applied for NBA Accreditation– Tier I/II UG (Engineering) Institute Programs

Program Name : Mechanical Engineering	**Discipline**: Engineering & Technology
Level : Under Graduate	**Tier**: 1
Application No: 10860	**Date of Submission**: 14-07-2025

PART A- Profile of the Institute

A1.Name of the Institute: Pandit Deendayal Energy University	
Year of Establishment : 2010	Location of the Institute: Gandhinagar
A2. Institute Address:PANDIT DEENDAYAL PETROLEUM UNIVERSITY, RAISAN,GANDHINAGAR, 382007	
City:Gandhinagar	State:Gujarat
Pin Code:382007	Website:www.pdeu.ac.in
Email:registrar@pdpu.ac.in	Phone No(with STD Code):079-23275007
A3. Name and Address of the Affiliating University (if any):	
Name of the University :	City: Gandhinagar
State : Gujarat	Pin Code: 0
A4. Type of the Institution: University	
A5. Ownership Status: Self financing	

A6. Details of all Programs being Offered by the Institution:

- No. of UG programs: **12**
- No. of PG programs: **22**

Table No. A6.1: List of all programs offered by the Institute.

Sr.No.	Discipline	Level of program	Name of the program	Year of Start	Year of Closed	Name of The Department
1	Engineering & Technology	PG	Artificial Intelligence	2022	--	Information and Communication Technology
2	Engineering & Technology	UG	Automobile Engineering	2020	2023	Automobile Engineering
3	Engineering & Technology	UG	Biotechnology	2023	--	Biotechnology
4	Engineering & Technology	UG	Chemical Engineering	2011	--	Chemical Engineering
5	Engineering & Technology	PG	Chemical Engineering	2016	--	Chemical Engineering
6	Engineering & Technology	UG	Civil Engineering	2010	--	Civil Engineering
7	Engineering & Technology	PG	Civil Engineering (Construction Technology & Management)	2024	--	Civil Engineering
8	Engineering & Technology	PG	Civil Engineering (Infrastructure Engineering & Management)	2013	2024	Civil Engineering
9	Engineering & Technology	PG	Civil Engineering (Transportation Engineering)	2019	2025	Civil Engineering
10	Engineering & Technology	UG	Computer Engineering	2016	--	Computer Science and Engineering
11	Engineering & Technology	UG	Computer Science and Business System	2024	--	Computer Science and Engineering
12	Engineering & Technology	PG	Cyber Security	2020	--	Computer Science and Engineering

13	Engineering & Technology	PG	Data Science	2020	--	Computer Science and Engineering
14	Engineering & Technology	UG	Electrical Engineering	2010	--	Electrical Engineering
15	Engineering & Technology	PG	Electrical Engineering (Power Systems)	2013	--	Electrical Engineering
16	Engineering & Technology	UG	Electronics & Communication Engineering	2020	--	Electronics and Communication Engineering
17	Engineering & Technology	PG	Energy and Environmental Engineering	2020	2024	Chemical Engineering
18	Engineering & Technology	PG	Energy Systems (Focused on Solar, EV and Green Hydrogen)	2025	--	Solar Energy
19	Engineering & Technology	PG	Energy Systems (Solar Energy)	2009	2025	Solar Energy
20	Engineering & Technology	PG	Environmental Engineering	2015	2025	Civil Engineering
21	Engineering & Technology	PG	Environmental Engineering and Management	2025	--	Civil Engineering
22	Engineering & Technology	PG	Geotechnical & Geoenvironmental Energy	2021	2022	Petroleum Engineering
23	Engineering & Technology	UG	Information & Communication Technology	2016	--	Information and Communication Technology
24	Engineering & Technology	PG	Mechanical Engineering	2024	--	Mechanical Engineering
25	Engineering & Technology	UG	Mechanical Engineering	2010	--	Mechanical Engineering
26	Engineering & Technology	PG	Mechanical Engineering (Design)	2018	2024	Mechanical Engineering
27	Engineering & Technology	PG	Mechanical Engineering (Manufacturing)	2019	2024	Mechanical Engineering
28	Engineering & Technology	PG	Mechanical Engineering (Thermal Engineering)	2013	2024	Mechanical Engineering
29	Engineering & Technology	PG	Nuclear Science and Technology	2009	2023	Nuclear Engineering
30	Engineering & Technology	UG	Petrochemical Engineering	2021	2022	Petroleum Engineering
31	Engineering & Technology	UG	Petroleum Engineering	2007	--	Petroleum Engineering
32	Engineering & Technology	PG	Petroleum Engineering	2010	--	Petroleum Engineering
33	Engineering & Technology	PG	Petroleum Technology (Exploration)	2019	2022	Petroleum Engineering
34	Engineering & Technology	PG	VLSI Design	2024	--	Electronics and Communication Engineering

A7. Programs to be considered for Accreditation vide this Application:

Table No. A7.1: List of programs to be considered for accreditation.

Name of the Department	Having Allied Departments	Name of the Program	Program Level
Mechanical Engineering	No	Mechanical Engineering	UG

Table No. A7.2: Allied Department(s) to the Department of the program considered for accreditation as above.
Cluster ID. Name of the Department (in table no. A7.1) Name of allied Departments/Cluster (for table no. A7.1)

No Record

PART-B: Program information

B1. Provide the Required Information for the Program Applied For:

Table No. B1: Program details.

A. List of the Programs Offered by the Department:

SR.NO.	PROGRAM NAME	PROGRAM APPLIED LEVEL	YEAR OF START / YEAR OF CLOSED	SANCTIONED INTAKE	INCREASE/DECREASE INTAKE (if any)	YEAR OF INCREASE/DECREASE	CURRENT INTAKE	YEAR OF AICTE APPROVAL	AICTE/COMPETENT AUTHORITY ARROVAL DETAILS
1	Mechanical Engineering	UG	2010 / --	120	No	NA	120	2010	AICTE approved

List of the Allied Departments/Cluster and Programs:

B2. Detail of Head of the Department for the program under consideration:

A. Name of the HoD :	Prof. Rajesh Patel
B. Nature of appointment:	Regular
C. Qualification:	Ph.D

B3. Program Details

Table No.B3.1: Admission details for the program excluding those admitted through multiple entry and exit points.

Item (Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)	2024-25 (CAY)	2023-24 (CAYm1)	2022-23 (CAYm2)	2021-22 (CAYm3)	2020-21 (CAYm4)	2019-20 (CAYm5)	2018-19 (CAYm6)
N=Sanctioned intake of the program (as per AICTE /Competent authority)	120	120	120	120	120	120	120
N1=Total no. of students admitted in the 1st year minus the no. of students, who migrated to other programs/ institutions plus no. of students, who migrated to this program	179	128	82	113	121	137	128
N2=Number of students admitted in 2nd year in the same batch via lateral entry including leftover seats	0	26	64	43	40	21	16
N3=Separate division if any	0	0	0	0	0	0	0
N4=Total no. of students admitted in the 1st year via all supernumerary quotas	0	0	0	0	0	0	0
Total number of students admitted in the program (N1 + N2 + N3 + N4) - excluding those admitted through multiple entry and exit points.	179	154	146	156	161	158	144

CAY= Current Academic Year. CAYm1= Current Academic Year Minus 1 CAYm2= Current Academic Year Minus 2. LYG= Last Year Graduate. LYGm1= Last Year Graduate Minus 1. LYGm2= Last Year Graduate Minus 2.

B4. Enrolment Ratio in the First Year

Table No. B4.1: Student enrolment ratio in the 1st year.

Year of entry	N (From Table 4.1)	N1 (From Table 4.1)	N4 (From Table 4.1)	Enrollment Ratio [(N1/N)*100]
2024-25 (CAY)	120	179	0	149.17
2023-24 (CAYm1)	120	128	0	106.67
2022-23 (CAYm2)	120	82	0	68.33

Average [(ER1 + ER2 + ER3) / 3] = 108.06≡ 100

B5. Success Rate of the Students in the Stipulated Period of the Program

Table No.B5.1: The success rate in the stipulated period of a program.

Item	(2020-21) LYG	(2019-20) LYGm1	(2018-19) LYGm2
A*= (No. of students admitted in the 1st year of that batch and those actually admitted in the 2nd year via lateral entry, plus the number of students admitted through multiple entry (if any) and separate division if applicable, minus the number of students who exited through multiple entry (if any).	161.00	158.00	144.00
B=No. of students who graduated from the program in the stipulated course duration	147.00	143.00	133.00
Success Rate (SR)= (B/A) * 100	91.30	90.51	92.36

Average SR of three batches ((SR_1+ SR_2+ SR_3)/3): 91.39

B6. Academic Performance of the First-Year Students of the Program

Table No.B6.1: Academic Performance of the First-Year Students of the Program.

Academic Performance	CAYm1(2023-24)	CAYm2(2022-23)	CAYm3 (2021-22)
Mean of CGPA or mean percentage of all successful students(X)	7.30	7.30	8.03
Y=Total no. of successful students	124.00	74.00	103.00
Z=Total no. of students appeared in the examination	128.00	79.00	112.00
API [X*(Y/Z)]	7.07	6.84	7.38

Average API[(AP1+AP2+AP3)/3] : 7.10

B7: Academic Performance of the Second Year Students of the Program

Table No.B7.1: Academic Performance of the Second Year Students of the Program.

Academic Performance	CAYm1 (2023-24)	CAYm2 (2022-23)	CAYm3 (2021-22)
X=(Mean of 2nd year grade point average of all successful students on a 10-point scale) or (Mean of the percentage of marks of all successful students in 2rd year/10)	7.01	7.23	8.91
Y=Total no. of successful students	128.00	136.00	148.00
Z=Total no. of students appeared in the examination	140.00	146.00	156.00
API [X * (Y/Z)]	6.41	6.73	8.45

Average API [(AP1 + AP2 + AP3)/3] : 7.20

B8. Academic Performance of the Third Year Students of the Program

Table No.B8.1: Academic Performance of the Third Year Students of the Program

Academic Performance	CAYm1 (2023-24)	CAYm2 (2022-23)	CAYm3 (2021-22)
X=(Mean of 3rd year grade point average of all successful students on a 10-point scale) or (Mean of the percentage of marks of all successful students in 3rd year/10)	7.46	8.63	8.82
Y=Total no. of successful students	130.00	148.00	143.00
Z=Total no. of students appeared in the examination	136.00	148.00	146.00
API [X*(Y/Z)]:	7.13	8.63	8.64

Average API [(AP1 + AP2 + AP3)/3] : 8.13

B9. Placement, Higher Studies, and Entrepreneurship

Table No.B9.1: Placement, higher studies, and entrepreneurship details.

Item	LYG (2020-21)	LYGm1(2019-20)	LYGm2(2018-19)
FS*=Total no. of final year students	160.00	143.00	136.00
X=No. of students placed	78.00	59.00	58.00
Y=No. of students admitted to higher studies	23.00	28.00	45.00
Z= No. of students taking up entrepreneurship	5.00	15.00	1.00
Placement Index(P) = (((X + Y + Z)/FS) * 100):	66.25	71.33	76.47

Average Placement Index = (P_1 + P_2 + P_3)/3: 71.35 Placement Index Points:

PART C: Faculty Details in Department and Allied Departments

(Data to be filled in for the Department and Allied Departments)

C1. Faculty details of Department and Allied Departments

Table No.C1: Faculty details in the Department for the past 3 years including CAY

Sr.No	Name of the Faculty	PAN No.	Highest degree	University	Area of Specialization	Date of Joining in this Institution	Experience in years in current institute	Designation at Time Joining in this Institution	Present Designation	The date on which Designated as Professor/ Associate Professor if any	Nature o Associat (Regular Contract Ad hoc)
1	Prof. Surendra Singh Kachhwaha	XXXXXXX94F	Ph.D	Indian Institute of Technology, Delhi	Thermal Engineering, Renewable Energy, Bioenergy	16/05/2011	14.1	Professor	Professor	16/05/2011	Regular
2	Prof. Vishvesh J Badheka	XXXXXXX08G	Ph.D	The M.S.University of Baroda,Vadodara	Metallurgical Engineering	01/09/2007	17.10	Assistant Professor	Professor	01/09/2017	Regular
3	Prof. Anurag Mudgal	XXXXXXX22M	Ph.D	Indian Institute of Technology, Delhi	"Heat Transfer and Applied Mechanics"	26/01/2014	11.5	Associate Professor	Professor	01/09/2022	Regular
4	Prof. Rajesh Patel	XXXXXXX54D	Ph.D	New Jersey Institute of Technology: NJ, US	Battery Thermal Management, Water Desalination, Fluid catalytic cracking	14/08/2011	13.10	Assistant Professor	Professor	01/03/2025	Regular
5	Prof. Vivek K Patel	XXXXXXX09D	Ph.D	S.V. National Institute of Technology, Surat	Thermal System Optimization, Energy Efficient Cooling	06/04/2015	10.3	Assistant Professor	Professor	01/05/2024	Regular
6	Dr. Jatinkumar Ravjibhai Patel	XXXXXXX62D	Ph.D	Hemchandracharya North Gujarat University	Solar Drying, Waster water treatment, Refrigeration and Air Conditioning	01/01/2009	16.6	Lecturer	Associate Professor	02/02/2021	Regular
7	Dr. Ramesh K. Guduru	XXXXXXX03N	Ph.D	NC State University, USA	Green Energy, CO2 Capture, Nanomaterials, Li-ion Batteries and Energy Storage, Circular Economy	05/09/2019	5.10	Associate Professor	Associate Professor	05/09/2019	Regular
8	Dr. Nanji J. Hadia	XXXXXXX65N	Ph.D	IIT Bombay	Thermal and fluid engineering, CO2 sequestration, EOR, Green Energy	16/05/2022	3.1	Associate Professor	Associate Professor	16/05/2022	Regular
9	Dr. Abhishek Kumar	XXXXXXX43G	Ph.D	BITS Pilani	Manufacturing	13/05/2013	12.1	Assistant Professor	Associate Professor	01/09/2022	Regular
10	Dr. M B Kiran	XXXXXXX09K	Ph.D	Indian Institute of Technology, Madras	Manufacturing/Inspection	06/01/2014	11.6	Associate Professor	Associate Professor	06/01/2014	Regular
11	Dr. Pavan Kumar G	XXXXXXX89H	Ph.D	BITS Pilani	Additive Manufacturing	27/07/2015	9.11	Assistant Professor	Associate Professor	01/09/2022	Regular
12	Dr. Nirav P Patel	XXXXXXX69J	Ph.D	Institute of Technology, Nirma University	Mechanics of Advanced Materials	30/12/2013	11.6	Lecturer	Associate Professor	01/05/2024	Regular
13	Dr. Vinay Vakharia	XXXXXXX39L	Ph.D	PDPM IIITDM Jabalpur	Machine Learning and Fault Diagnosis	22/02/2016	9.4	Assistant Professor	Associate Professor	01/05/2024	Regular
14	Dr. Jaydeep Patel	XXXXXXX83H	Ph.D	Pandit Deendayal Energy University	Renewable Energy	10/08/2011	13.11	Lecturer	Assistant Professor		Regular
15	Dr. Nagababu G	XXXXXXX95K	Ph.D	Pandit Deendayal Petroleum University	Marine renewable energy	01/01/2013	12.6	Lecturer	Assistant Professor		Regular
16	Dr. Rakesh Chaudhari	XXXXXXX69J	Ph.D	Pandit Deendayal Energy University, Gandhinagar	Advance Manufacturing Processes	02/07/2014	11	Lecturer	Assistant Professor		Regular
	Dr. Parth			Pandit Deendayal	Thermal systems				Assistant		

17	Prajapati	XXXXXXX21P	Ph.D	Energy University	optimization	07/07/2014	11	Lecturer	Professor		Regular
18	Dr. Krunal Mehta	XXXXXXX67B	Ph.D	Pandit Deendayal Energy University	Tribology and Surface Composites	07/07/2015	10	Lecturer	Assistant Professor		Regular
19	Dr. Kishan Ashok Fuse	XXXXXXX31E	Ph.D	Pandit Deendayal Energy University	Solid State Wleding, Additive Manufacturing	06/07/2015	10	Lecturer	Assistant Professor		Regular
20	Dr. Rahul Deharkar	XXXXXXX99N	Ph.D	Pandit Deendayal Energy University	Mathematical modeling, CFD and FEA	01/07/2015	10	Lecturer	Assistant Professor		Regular
21	Dr. Bhasuru Abhinaya Srinivas	XXXXXXX36Q	Ph.D	Pandit Deendayal Energy University	Thermal power, Renewable energy	29/06/2015	10	Lecturer	Assistant Professor		Regular
22	Dr. Hiren Dave	XXXXXXX36R	Ph.D	S. V. National Institute of Technology - Surat	Internal cobmubstion engines and Alternate Fuels	11/07/2022	2.11	Assistant Professor	Assistant Professor		Regular
23	Dr. Ravi Kant	XXXXXXX26R	Ph.D	Indian Institute of Technology Gandhinagar	Robotics & Control, Fluid flow control,	01/07/2019	6	Lecturer	Assistant Professor		Regular
24	Dr. Manjeet Keshav	XXXXXXX26B	Ph.D	Indian Institute of Technology Madras, Chennai	Data-Driven Dynamics	01/12/2020	4.7	Lecturer	Assistant Professor		Regular
25	Dr. Anirudh Kulkarni	XXXXXXX06D	Ph.D	Indian Institute of Technology Indore	Computational Fluid Dynamics, Finite Element Analysis, and Biomedical Engineering	21/07/2020	4.11	Assistant Professor	Assistant Professor		Regular
26	Dr. Pravesh Kumar	XXXXXXX49N	Ph.D	Indian Institute of Technology Jodhpur	Flexible robotics, Nonlinear Dynamics, Mechanical VIbrations	15/12/2022	2.6	Assistant Professor	Assistant Professor		Regular
27	Dr. Rajat Saxena	XXXXXXX48R	Ph.D	Indian Institute of Technology Delhi	Thermal Energy Storage applications	01/01/2020	5.6	Assistant Professor	Assistant Professor		Regular
28	Dr. Vivek Jaiswal	XXXXXXX49G	Ph.D	Indian Institute of Technology Ropar	Thermo-fluid	03/10/2022	2.9	Assistant Professor	Assistant Professor		Regular
29	Dr. Saurabh Tiwari	XXXXXXX88E	Ph.D	Indian Institute of Information Technology Jabalpur	Condition Monitoring, Signal Processing, Machine Learning	01/10/2024	0.9	Assistant Professor	Assistant Professor		Contract Fulltime
30	Dr. Vishal Vyas	XXXXXXX65H	Ph.D	Indian Institute of Technology Bombay	Nonlinear Dynamics and Vibrations	17/10/2024	0.8	Assistant Professor	Assistant Professor		Contract Fulltime
31	Dr. Ojas Sathbhai	XXXXXXX70H	Ph.D	Indian institute technology kharagpur	Thermal engineering and solidification, Modeling	05/01/2023	2.6	Assistant Professor	Assistant Professor		Regular
32	Dr. Ankur Chaurasia	XXXXXXX19M	Ph.D	Indian institute technology Roorkee	Atomistic Simulation, High Entropy Alloy	13/06/2016	8	Lecturer	Assistant Professor		Regular
33	Dr. Pankaj Sahlot	XXXXXXX80Q	Ph.D	Indian institute technology Gandhinagar	Additive Manufacturing, Welding	09/07/2018	4.4	Assistant Professor	Assistant Professor		Regular
34	Dr.Vishal Ashok Wankhede	XXXXXXX25C	Ph.D	NIT Trichy	Industry 4.0, Sustainable Manufacturing	01/07/2016	6.11	Lecturer	Assistant Professor		Regular
35	Dr. Jaykumar Vora	XXXXXXX45F	Ph.D	Pandit Deendayal Petroleum University	Advanced Manufacturing	13/10/2015	9.8	Lecturer	Assistant Professor		Regular
36	Mr. Nilavjyoti Sarmah	XXXXXXX85K	M.Tech	Gauhati University	Robotics	11/06/2025	0	Assistant Professor	Assistant Professor		Contract Fulltime

Table No.C2: Faculty details of Allied Departments for the past 3 years including CAY.

C2. Student-Faculty Ratio (SFR)

No. of UG(Engineering) programs in Department including allied departments/ clusters (UGn):
UG1=1st UG program
UGn=nth UG program
B= No. of Students in UG 2nd year (ST)
C= No. of Students in UG 3rd year (ST)
D= No. of Students in UG 4th year (ST)
No. of PG (Engineering) programs in Department including allied departments/ clusters (PGm):
PG1=1st PG program.
PGm=mth PG program
A= No. of Students in PG 1st year
B= No. of Students in PG 2nd year
Student Faculty Ratio **(SFR)** = S/F
S= No. of students of all programs in the Department including all students of allied departments/clusters.
No. of students (ST)=Sanctioned Intake (SA)+ Actual admitted students via lateral entry including leftover seats (L) if any (limited to 10 % of SA)
Students who admitted under supernumerary quotas (SNQ, EWS, etc) will not be considered in calculating SFR value. Those students are exempted.
F=Total no. of regular or contractual faculty members (Full Time) in the Department, including allied departments/clusters (excluding first year faculty (The faculty members who have a 100% teaching load in the first-year courses)).

No. of UG Programs in the Department1 No. of PG Programs in the Department4

Table No.C2.1: Student-faculty ratio.

Description	**CAY(2024-25)**	**CAYm1 (2023-24)**	**CAYm2 (2022-23)**
UG1.B	132	132	132
UG1.C	132	132	132
UG1.D	132	132	132
UG1: Mechanical Engineering	**396**	**396**	**396**
PG1.A	36	0	0
PG1.B	0	0	0
PG1: Mechanical Engineering	**36**	**0**	**0**
PG2.A	0	18	18
PG2.B	18	18	18
PG2: Mechanical Engineering (Design)	**18**	**36**	**36**
PG3.A	0	18	18
PG3.B	18	18	18
PG3: Mechanical Engineering (Manufacturing)	**18**	**36**	**36**
PG4.A	0	18	18
PG4.B	18	18	18
PG4: Mechanical Engineering (Thermal Engineering)	**18**	**36**	**36**
DS=Total no. of students in all UG and PG programs in the Department	486	504	504
AS=Total no. of students of all UG and PG programs in allied departments	0	0	0
S=Total no. of students in the Department (DS) and allied departments (AS)	**S1=** 486	**S2=** 504	**S3=** 504
DF=Total no. of faculty members in the Department	30	31	29
AF= Total no. of faculty members in the allied Departments	0	0	0
F=Total no. of faculty members in the Department (DF) and allied Departments (AF)	**F1=** 30	**F2=** 31	**F3=** 29
FF=The faculty members in F who have a 100% teaching load in the first-year courses	3	4	4
Student Faculty Ratio (SFR)=S/(F-FF)	**SFR1= 18.00**	**SFR2= 18.67**	**SFR3= 20.16**
Average SFR for 3 years	**SFR= 18.94**		

C3. Faculty Qualification

- Faculty qualification index (FQI) = 2.5 * [(10X +4Y)/RF] where
- X=No. of faculty members with Ph.D. degree or equivalent as per AICTE/UGC norms.
- Y=No. of faculty members with M. Tech. or ME degree or equivalent as per AICTE/ UGC norms.
- RF=No. of required faculty in the Department including allied Departments to adhere to the 20:1 Student-Faculty ratio, with calculations based on both student numbers and faculty requirements as per section C2 of this documents: (RF=S/20).

Table No.C3.1: Faculty qualification.

Year	**X**	**Y**	**RF**	**FQ = 2.5 x [(10X + 4Y) / RF)]**
2024-25(CAY)	30	0	24.00	31.25

2023-24(CAYm1)	31	0	25.00	31.00
2022-23(CAYm2)	26	3	25.00	27.20

C4. Faculty Cadre Proportion

- Faculty Cadre Proportion is 1(RF1): 2(RF2): 6(RF3)
- RF1= No. of Professors required = 1/9 * No. of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (S) as per C2 of this documents:.
- RF2= No. of Associate Professors required = 2/9 * No. of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (S) as per section C2 of this documents:.
- RF3= No. of Assistant Professors required = 6/9 * No. of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (S) as per section C2 of this documents:.
- Faculty cadre and qualification and experience should be as per AICTE/UGC norms.

Table No.C4.1: Faculty cadre proportion details.

Year	Professors		Associate Professors		Assistant Professors	
	Required RF1	Available AF1	Required RF2	Available AF1	Required RF3	Available AF3
2024-25	2.00	4.00	5.00	9.00	16.00	17.00
2023-24	2.00	3.00	5.00	8.00	16.00	20.00
2022-23	2.00	2.00	5.00	7.00	16.00	20.00
Average	RF1=2.00	AF1=3.00	RF2=5.00	AF2=8.00	RF2=16.00	AF2=19.00

C5. Visiting/Adjunct Faculty/Professor of Practice

Table No. C5.1: List of visiting/adjunct faculty/professor of practice and their teaching and practical loads.

(CAYm1)

S.No	Name of the Person	Designation	Organization	Name of the Course	No. of hours handled
1	Dr. Ghanshyam Tejani	Assistant Professor	GSFC University, Vadodara	Mechanical Measurement and Metrology	24.00
2	Dr. Ghanshyam Tejani	Assistant Professor	GSFC University, Vadodara	Strength of Material	24.00
3	Dr. Ghanshyam Tejani	Assistant Professor	GSFC University, Vadodara	Workshop Practice	16.00

(CAYm2)

S.No	Name of the Person	Designation	Organization	Name of the Course	No. of hours handled
1	Dr. Harshal Oza	Co-Founder	APTRaise Technologies, Ahmedabad	Robotics	42.00

(CAYm3)

S.No	Name of the Person	Designation	Organization	Name of the Course	No. of hours handled
1	Dr. Harshal Oza	Co-Founder	APTRaise Technologies, Ahmedabad	Theory of Machines	42.00
2	Dr. Harshal Oza	Co-Founder	APTRaise Technologies, Ahmedabad	Control System Engineering	42.00
3	Dr. Harshal Oza	Co-Founder	APTRaise Technologies, Ahmedabad	Dynamics of Machine	30.00
4	Dr. Harshal Oza	Co-Founder	APTRaise Technologies, Ahmedabad	Robotics	30.00
5	Dr. Harshal Oza	Co-Founder	APTRaise Technologies, Ahmedabad	Project	20.00

C6. Academic Research

Table No. C6.1: Faculty publication details.

S.No.	Item	2023-24 (CAYm1)	2022-23 (CAYm2)	2021-22 (CAYm3)
1	No. of peer reviewed journal papers published	60	66	55
2	No. of peer reviewed conference papers published	21	12	24
3	No. of books/book chapters published	10	10	22

C7. Sponsored Research Project

Table No. C7.1: List of sponsored research projects received from external agencies.

(CAYm1)

PI Name	Co-PI names if any	Name of the Dept., where project is sanctioned	Project Title*	Name of the Funding agency	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25
Ms. Mrunalini Rana	Dr. Dhruvesh Patel, Dr. Vinay Vakharia	Civil Engineering	Performance evaluation of 1d and 2d hydrodynamic model with different topographic resolution for strengthening a decision making of urban flood hazard mapping a case application of UAV, hydrodynamic modelling and ML techniques	Department of Science & Technology	31-05-2023 to 29-05-2026	27.51
Dr. Nirav Patel	Dr. Ankur Chaurasia	Mechanical Engineering	Covalently functionalized bio-inspired composite protective structure subjected to impact loading	Science and Engineering Research Board	22-12-2023 to 21-12-2026	27.21
Dr. Ojas Satbhai	NA	Mechanical Engineering	Numerical and experimental study of solidification cracking for Laser Direct Metal Deposition process and keyhole welding process	Science and Engineering Research Board	25-01-2024 to 24-01-2027	8.25
						Amount received (Rs.):62.97

(CAYm2)

PI Name	Co-PI names if any	Name of the Dept., where project is sanctioned	Project Title*	Name of the Funding agency	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25
Mr. Milap Pandya	Dr. Nirav Patel	Mechanical Engineering	Application of Friction stir Channelling (FSC) process to manufacture cold plate for power electronics cooling	The Institution of Engineers (India)	29-07-2022 to 31-08-2023	1.00
Mr. Vatsal Vaghasia Dr. Jay Vora	Dr. Rakesh Chaudhari	Mechanical Engineering	Investigations on Fabrication of PEEK-NITI Hybrid Implants for Bio-Medical Application via Additive Manufacturing Route	The Institution of Engineers, India	21-10-2022 to 31-12-2023	0.76
Dr. Vishvesh Badheka	NA	Mechanical Engineering	Comparison of mechanical and metallurgical properties of similar and dissimilar weld joints of RAFMS and 316ln using solid state and fusion welding processes	Science and Engineering Research Board	01-11-2022 to 31-10-2025	8.25
Prof. Anirbid Sircar	Prof. Surendra Singh Kachhwaha, Mr. Abhinav Kapadia	Petroleum Technology	Technology Enabling Centre: Energy, Health and Water	Department of Science & Technology	20-02-2023 to 19-02-2028	336.44
Dr Manoj Sahni	Prof. Vishvesh J Badheka	Mathematics	Experimental and Numerical investigation of Functionally graded Engineering Components due to thermal mismatch and Youn's Modulus	Gujarat Council on Science and Technology	20-06-2023 to 19-06-2025	9.04
						Amount received (Rs.):355.49

(CAYm3)

PI Name	Co-PI names if any	Name of the Dept., where project is sanctioned	Project Title*	Name of the Funding agency	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25

Dr. Vivek Patel	Dr. Rajat Saxena, Dr. Jatin Patel	Mechanical Engineering	Smart Steam Disinfection System to Fight COVID 19 in Public Places	Gujarat Council on Science and Technology	09-04-2021 to 08-04-2022	18.04
Prof. Surendra Singh Kachhwaha	Dr. Pravin Kodgire	Petroleum Technology	(a) Energy efficient Biodiesel production technology at industrial scale (b) improvement in yield and quality (fuel properties) of biodiesel	Shell Energy India Private Limited	06-05-2021 to 31-03-2025	70.75
Dr. Ramesh K. Guduru	Dr. R. K. Vij, Dr. Anurag A. Gupta, Dr. Paul Naveen	Petroleum Technology	Atmospheric CO2 Capture and Its Efficient Utilization in Production of Value-Added Products: Electricity, Hydrogen and Bicarbonate Salts via Aqueous Electrolyte Media	Shell Energy India Private Limited	06-05-2021 to 31-03-2026	63.99
Dr. Ramesh K. Guduru	Dr. R. K. Vij, Dr. Anurag A. Gupta, Dr. Surendra Sasi, Dr. Paul Naveen	Petroleum Technology	Development of scalable Coastal Energy Plants (CEP) with Aluminium Scrap and Seawater for Production of Hydrogen, Electricity and Aluminium Hydroxide	Shell Energy India Private Limited	06-05-2021 to 31-09-2025	62.43
Dr. Rajesh Patel	Dr. Rajat Saxena	Mechanical Engineering	Design and Development of Hybrid Battery Thermal Management System for Electric Vehicles (EVs) using Phase Change Material	Gujarat Council on Science and Technology	01-06-2022 to 31-12-2024	27.05
Prof. Anurag Mudgal	NA	Mechanical Engineering	Going Global Collaborative Partnership Project (GGCPP) 'Masters in circular economy	British Council	01-12-2021 to 01-12-2022	11.00
Dr. Pavan Kumar Gurrala	Dr. Sheetal Rawat, Dr. Brijesh Tripathi, Dr. Manoj Kumar	Mechanical Engineering	3D printing of organic-inorganic composite scintillation detectors	Board of Research in Nuclear Sciences	07-12-2021 to 01-02-2025	36.16
						Amount received (Rs.):289.42

Total Amount (Lacs) Received for the Past 3 Years: 707.88

Note*:

- Only sponsored research projects will be considered. Infrastructure-based projects will not be considered here.

C8. Consultancy Work

Table No. C8.1: List of consultancy projects received from external agencies.

(CAYm1)

PI Name	Co-PI names if any	Name of the Dept., where project is sanctioned	Project Title*	Name of the Funding agency	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25
Dr. Jaykumar J. Vora	NA	Mechanical Engineering	Different Testing and analysis as per annexure -1	M/s ITW India Limited (phase -1)	23-11-2023 to 22-05-2024	0.12
Dr. Jaykumar J. Vora	NA	Mechanical Engineering	Designing of testing map arrangement for EDM cutting	M/s Rudra Industries	23-11-2023 to 12-02-2024	0.51
Dr. Ravi Kant, Dr. Manjeet Keshav	NA	Mechanical Engineering	Drop Tester for package mishandling worthiness	M/s Packtest Machines INC	06-11-2023 to 30-06-2024	0.51
Dr. Kishan Fuse	NA	Mechanical Engineering	Performing friction stir processing of MG alloy and its characterization	M/s. Pravara Rural Engineering College	13-09-2023 to 01-10-2023	0.30
Dr. Vivek Jaiswal	NA	Mechanical Engineering	Research Collaboration on sustainable air quality management and assessment	M/s Urban Air Labs Pvt Ltd	01-03-2024 to 09-07-2024	0.30
Dr. Anirudh Kulkarni	Dr. Abhishek Yadav	Mechanical Engineering Department & Chemical Engineering	Thermo-Mechanical Analysis of Vinylidene Floride Furnace	Gujarat Fluorochemicals Ltd.	23-05-2023 to 08-10-2024	10.05

						Amount received (Rs.):11.79

(CAYm2)

PI Name	Co-PI names if any	Name of the Dept., where project is sanctioned	Project Title*	Name of the Funding agency	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25
Dr. Vinay Vakharia	Dr. Paawan Sharma	Mechanical Engineering	1. Method for the detection of tire failure in bead durability testing using gas sensor and machine learning approach 2. Method for the detection of tire failure in belt durability testing using line laser and machine learning approach	M/s Ceat	05-12-2023 to 02-01-2024	2.27
						Amount received (Rs.):2.27

(CAYm3)

PI Name	Co-PI names if any	Name of the Dept., where project is sanctioned	Project Title*	Name of the Funding agency	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25
NA	NA	NA	NA	NA	NA	0.00
						Amount received (Rs.):0.00

Total amount (Lacs) received for the past 3 years: 14.06

Note*:

- Only consultancy projects will be considered. Infrastructure-based projects will not be considered here.

C9. Institution Seed Money or Internal Research Grant to its Faculty for Research Work

Table No. C9.1: List of faculty members received seed money or internal research grant from the Institution.

(CAYm1)

(CAYm2)

(CAYm3)

Total amount (Lacs) received for the past 3 years :

PART D: Laboratory Infrastructure in the Department

(Data to be filled in for the Department)

D1. Adequate and Well-Equipped Laboratories, and Technical Manpower

Table No.D1.1: List of laboratories and technical manpower.

Sr. No	Name of the Laboratory	Number of students per set up(Batch Size)	Name of the Important Equipment	Weekly utilization status(all the courses for which the lab is utilized)	Technical Manpower Support		
					Name of the Technical staff	Designation	Qualification
1	Fluid Mechanics Laboratory & Fluid Machinery Laboratory	5	• Reynolds apparatus, • Discharge through Venturi meter, Orifice meter &	16	Mr. Ashok Cha	Tradesman	National Coun
2	Manufacturing Process –II Laboratory	5	• Universal Milling Machine • Medium-duty all Geared Lath Machine •	16	Mr. Ashok Cha	Tradesman	National Coun
3	Workshop Practice Laboratory	30	• Bench Vice, • Hacksaw, • Hammer, • Vernier Calipers, •	16	Mr. Ashok Cha	Tradesman	National Coun
4	Production Technology Laboratory	15	• Spark Erosion (EDM) Machine • Lathe Tool Dynamometer • Milling	8	Mr. Jayesh Pai	Laboratory Ass	National Coun
5	Manufacturing Process-2 Laboratory & Foundry	5	• Gas cutting and Gas welding, • Spot cum projection welding machine, •	8	Mr. Jayesh Pai	Laboratory Ass	National Coun
6		4		16	Mr. Mehul Kun	Laboratory Ass	Bachelor of Er

	Refrigeration and Air Conditioning Laboratory (F-		• Vapour Compression Refrigeration Cycle Test Rig with Data Acquisition, • Variable Vapour Compression				
7	Modeling & Simulation Lab (Mechanical Drawing	1	• SolidWorks • MATLAB & ANSYS	16	Mr. Mehul Kun	Laboratory Ass	Bachelor of Er
8	Strength of Materials Lab (Location: Central Workshop)	5	• Brinell cum Rockwell, • Hardness Machine, • Izod cum Charpy Test Machine, • Compression Testing	12	Mr. Arvind Mal	Laboratory Ass	Bachelor of Er
9	Thermodynamics Laboratory & Heat Transfer Laboratory (E-	5	• Single-stage air compressor test rig, • Bomb Calorimeter, • Electronic balance, • Magnetic	12	Mr. Piyush R.	Laboratory Ass	Diploma in Me
10	Engineering Metallurgy Laboratory	5	• Engineering metallurgy microscope, • Specimen cutting machine, • Belt grinder, • Sample	16	Mr. Piyush R.	Laboratory Ass	Diploma in Me
11	Mechanical Measurement and Metrology Laboratory (E-207)	5	• Profile Projector, • Sine Bar & Mechanical Gauges, • Vernier calipers, • Micrometer, • Dial	12	Mr. Alpeshsinh	Laboratory Ass	Bachelor of Er
12	Dynamics of Machines Laboratory & Design &	5	• CAM & Follower Apparatus with Motor, • Motorized Governor Apparatus, • Gyroscope apparatus	12	Mr. Trushar Pra	Laboratory Ass	Diploma in Me
13	Internal Combustion Engine Laboratory	5	• Equipment For Morse Test on Multi-Cylinder Petrol Engine with CNG Kit, • Dual Fuel Automotive Engine with	16	Mr. Umang So	Laboratory Ass	Master of Engi
14	Non-Conventional Energy Sources Laboratory	4	• Flat Plate Collector & Anemometer, • Solar Water Heating System, • Automatic weather station, • Solar	8	Mr. Umang So	Laboratory Ass	Master of Engi

D2. Safety Measures in Laboratories

Table No. D2.1: List of various safety measures in laboratories.

Sr. No	Laboratory Name	Safety Measures
1	Fluid Mechanics Laboratory Fluid Machinery Laboratory Refrigeration and Air Conditioning Laboratory Thermodynamics Laboratory	General safety rules, safety shoes, water / slip hazard, electrical - burns / shock, fire safety
2	Modeling & Simulation Lab Mechanical Measurement and Metrology Laboratory Engineering Graphics Laboratory Dynamics of Machines Laboratory	General safety rules, safety shoes, fire safety
3	Engineering Metallurgy Laboratory Manufacturing Process –II Laboratory Workshop Practice Laboratory Production Technology Laboratory	General safety rules, safety shoes, apron, earmuff, thermal gloves, safety goggles for the operator and students, fire safety Rotating equipment / machine tools-personal: Protective equipment: standing shields, personal care

D3. Project Laboratory/Research Laboratory

S. No.	Name of the Laboratory
1	Liquid Engineering laboratory
2	Centre of Excellence in Water Treatment and Management
3	Advanced Manufacturing Technology Centre (AMTC)
4	Siemens Center of Excellence (SCoE)
5	Centre for Biofuels and Bioenergy Studies (CBBS)

The Department of Mechanical Engineering has five (5) Centers of Excellence (CoE). The objectives of each center are unique in their ways, involving in overall development of students/scholars beyond the regular academics. Each CoE aims to develop and fulfill the skills, hands-on experience, and research endeavors in the students. The following list provides the details of the CoEs.

1. Liquid Engineering laboratory

Liquid Engineering Lab was established with the collaboration of Castrol India Limited (owned by British Petroleum) in the year 2016. The university has received a grant of Rs. 75 lakhs towards the lab development. The liquid engineering lab is equipped with a wide variety of experiential aids, which include technology-related experiments along with cut sections of various machinery, techno-gaming modules, motion-controlled projection, special facilities and rigs, simulators, access to a virtual engine, virtual plant visit, the Protosphere (3-D virtual learning), analytical laboratory with key analytical instruments. The prime objective of the facility is to provide exposure and training to students across various departments and disciplines for their better understanding of liquid engineering in the automotive sector. As a part of the exposure program, to date, the lab has given glimpses of liquid engineering to around 6500 students. Table 7.5 shows the details as part of the lab infrastructure.

Table 7.5: Lab infrastructure at Liquid Engineering Laboratory

Description	Equipment/module
Techno games: It is an interactive tool to simplify learning about lubricant technology. Techno games contain the following parts: 1. The Formulator 2. Viscosity Guru 3. Synth Racer	
Diesel Particulate Filter: The rig demonstrates the advantages of using low SAPs (Sulphated Ash, Phosphorous, and Sulphur) oils in a DPF-equipped vehicle.	
Car Engine - Transaxle cut section: It is a cut section of an engine-transaxle used for demonstrating different components & oil properties interactively required at each part by using magnetic darts.	
Feel the Difference: The demonstration highlights the difference between synthetic & mineral oil in terms of viscosity. The more the viscosity, the more viscous losses resulting in less power & fuel economy.	
Capillary tube Manual Viscometer: The machine has 6 viscometer holders and can measure the viscosity of three samples at a time.	
Cloud and Pour Point Apparatus (-80℃) Single Tank-Four Test: Measurement of pour point & cloud point of engine and gear oils. Can test four samples at a time.	
3D Auditorium: It is an auditorium wherein Castrol Technology, product development & blending capabilities are shown in the form of 3D videos.	

Motion sensor: Demonstration used for creating VOV factor and thoroughly explaining product technologies and propositions by using interactive software that responds to the users movements on the floor.	

2. Centre of Excellence in Water Treatment and Management: The Center of Excellence in Water Treatment has emerged with the help of funding from different eternally funded projects. Two main projects to mention are “Low Cost- Renewable Energy Driven (LC-RED) Water Treatment Solutions Centre”, funded by the Department of Science and Technology under the Water Technology initiative, and the other one is INDIA-H2O, funded jointly by the Department of Bio-Technology (DBT) and the European Union under the Horizon 2020 scheme. The value of both projects is above 50 crores, which is distributed among 25 partners from eight different countries. PDEU, being the lead partner in both projects, carries a major funded amount of over 10 Crore over a period of five years.

The prime objective of these projects is to design and develop a complete solution for low-cost treatment of industrial wastewater, domestic wastewater, and brackish saline groundwater water leading to zero liquid discharge with renewable energy applications to the extent possible. Concentrated Brine is used for growing Hylophitic crop Salicornia, which carries high nutritional value and can be picked for market, which is an established model in Israel. The focus for development is in the arid state of Gujarat, where surface water resources are very scarce. Cost-effective technologies and systems are being designed up to the TRL level of 6 with the aim of lowering energy costs through dramatic improvements in energy efficiency. The specific objectives are to develop and introduce novel batch-reverse osmosis technology for a 4-fold reduction in specific energy consumption with a high, 80%, recovery ratio using Thermal RO and integration of RO and FO. A pilot-scale RO-FO system producing 800 liters per hour, rurally relevant low-cost systems for brackish groundwater treatment to provide safe drinking water at costs below €0.35/m^3 (<30 rupees/m^3) has already been installed in a village near Somnath for a real field experiment. Development of phyto-technology solutions for rural domestic wastewater treatment to remove emerging pollutants is underway. Low for real-time monitoring of the key parameters important for efficient operation. Figure 7.5 details the water treatment unit batch RO-FO. The center has reached beyond academics and university education, thereby transforming into real-time products towards societal development. One such initiative can be seen in Figure 7.6, which details the plant up and running at Lodhva village.

Table 7.6 is the list of students who got a direct benefit of pursuing their project and/or seminar at this center.

Figure 7.5: Water Treatment unit Batch RO-FO

Figure 7.6: Lodhva village societal impact

Table 7.6: List of students who have utilized the center for their Seminar/Project work

3. Advanced Manufacturing Technology Centre (AMTC): Realizing the Aatmanirbhar Bharat vision by developing the capabilities in manufacturing through Advanced Manufacturing (AM) for Defence, Aerospace, Medical Energy sectors. Performing cutting-edge research and development in the metal AM domain. To develop a CoE that provides exposure to the advanced technologies in the field of AM and induces an interdisciplinary mindset among the students. Industry 4.0-based CoE has state-of-the-art facilities. Figure 7.7 shows a snapshot of the students, faculty, and professionals who benefited from getting trained at the AMTC. Figure 7.8 gives the details of the 3D metal printing facility that the AMTC hosts.

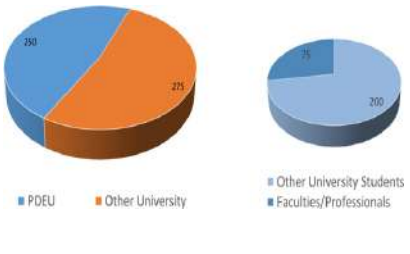


Figure 7.7: Students trained at AMTC

Overall Dimensions: 1650 x 1250 x 2400 mm.

Compartments: Build plate: Circular disk of 150 mm diameter

Build volume: 150 dia. x 180 mm height

Dispenser volume: 160 dia. x 260 mm depth

Material capabilities: Ti alloys, SS alloys, Co-Cr Power Source: Fibre optic, solid state, continuous YAG laser of 500 W

Figure 7.8: Detailed specifications of Intech iFusion SF-1 metal 3D printer.

Collaborations and Applications:

AMTC proudly caters to active collaborations and helps in developing applications for various industries.

A collaborative effort has been initiated between Nuclear Fuel Complex-Hyderabad (NFC), Mishra Dhatu Nigam Limited (MIDHANI), and PDEU, wherein metal powders are supplied by MIDHANI, and the test coupons were fabricated for NFC at the AMTC. Based on the early interactions, a prototype of one of the components was taken up for fabrication. A satisfactory build was obtained, which now leads to many more components to be printed and tested in collaboration, as shown in Figure 7.9.

Figure 7.9: Components for FBTR subassembly

The first phase of printing was successful and satisfactory to the team of scientists at the International Thermonuclear Experimental Reactor (ITER), Institute of Plasma Research (IPR). It is going to be taken forward to the next phase of printing after all the required important tests are carried out on the part at IPR. Figure 7.10 details the same.

Figure 7.10: Acceleration grid

Specimens at different unit cell sizes of gyroid topology were studied to investigate the effect of topology change and improvement and enhancement of surface area for thermal applications. The project was partly executed at the Space Application Center (SAC), ISRO, and partly at AMTC, PDEU. Charpy test specimens at different gyroid unit cell sizes were printed to test the impact properties of the structures, and microstructural specimens were prepared for metallurgical characterization. Printing was carried out for AlSi10Mg and SS316L metal powders. Figure 7.11 details the structure built at AMTC.

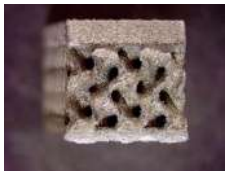


Figure 7.11: Gyroid structure for thermal management

Students working/worked at AMTC:

Along with training, the AMTC also handholds the students/scholars for their projects/theses. The following is the list of scholars/students who have utilized the resources at AMTC.

Ph.D. Scholars:

1. Sonal Gopal Bhai Modi (Roll No: 23RME004)

Research Topic: Tribology of Additively Manufactured (AM) Components

2. Parth Kanti Bhai Patel (Roll No: 25RME001)

Research Topic: Welding of Additively Manufactured (AM) components

M.Tech. Students:

1. Friction Stir Welding of Additively Manufactured AlSi10Mg to Copper: A study of Metallurgical and Mechanical Properties, Waako Stephen, Roll No. 23MMM007

2. Tribology of Additively Manufactured Components, Dixit Piyush, Roll No. 23MMM003

4. Siemens Center of Excellence (SCoE):

The Siemens Centre of Excellence was inaugurated on September 26, 2014, by Shri Saurabhbhai Patel, Honorable Minister, Finance, Energy and Petrochemicals, Mines & Minerals, Cottage Industries, Government of Gujarat, in the presence of dignitaries from the Government of Gujarat, Industries, and esteemed institutes.

The Siemens-Centre of Excellence has been established at PDPU (Pandit Deendayal Petroleum University), now renamed as PDEU, to cater to the needs of skilled manpower in the automotive industry. The Siemens Centre of Excellence is established under an agreement between Industries Commissionerate - Government of Gujarat, Siemens Industry Software (India) Pvt. Ltd., Design Tech Systems Ltd., India & PDPU, now renamed as PDEU.

The following is the list of objectives set at SCoE:

Qualitative improvements in Technical Education

1. Improvements in college labs infrastructure by adopting the latest open technologies in engineering design, manufacturing, analysis, and management to serve the needs of all the industrial units, irrespective of the use of the machinery and technologies.

2. Skill upgradation of faculty by training

3. Update course curriculum to modern industrial practices

· Promote Research & Development and innovation for existing industries.

· Promote Industry – academia interfacing to make improvements in the technical education system sustainable and in line with Industry requirements.

· Training of students to improve employability.

· Enhance the reputation of technical institutions as modern and equipped with state-of-the-art technologies.

· Create a pool of skilled manpower to cater to the current and future industrial landscape of the state.

· Availability of a trained workforce to attract industries to set up units in the State.

Under the umbrella of SCoE, there are three labs:

1. Product Design and Validation Lab (PDVL): The Product Design and Validation Laboratory is equipped with the latest configuration to support the UG NX training, equivalent to industry standards.

This lab is equipped with 30 workstations, as shown in Figure 7.12, and is provided with the most powerful tools, like NX9 CAD, FEMAP (Finite Element Modelling and Post Processing), NX9 Advanced Simulation, and Motion Analysis.

Figure 7.12: Product Design and Validation Lab

2. Advanced Manufacturing Lab (AML): The Advanced Manufacturing Laboratory is equipped with the latest configuration to support the UG NX training, Equivalent to industry standards.

The lab is equipped with 30 workstations and provides with industrys most advanced products like NX CAM, Digital Manufacturing products, and PLM Software. The details are shown in Figure 7.13.

SOFTWARE PACKAGE	ADVANTAGES
Computer Aided Manufacturing (CAM)	o create a faster production process and components and tooling with more precise dimensions and material consistency while simultaneously reducing energy consumption.
NX CAM	emonstrates comprehensive portfolio of digital manufacturing solutions that helps you realize innovation by synchronizing product engineering, manufacturing engineering and production
Digital Manufacturing	
TECNOMATIX	
Product Lifecycle Management (PLM)	t can be defined as an information strategy, it builds a coherent data structure by consolidating systems
TEAM CENTRE 10	

Figure 7.13: Details about the Advanced Manufacturing Lab

3. Computer Integrated Manufacturing Lab (CIM Lab): Computer-integrated manufacturing is the manufacturing approach of using computers to control the entire production process. The following are the key highlights:

• Knowledge of interfacing and automation techniques.

• Demonstrate automation combined with advanced manufacturing technology.

• Sequence Planning, Process Planning, Shop Floor Layout Generation.

• Learn about Offline / Online sequence execution techniques.

The details are shown in Figures 7.14, 7.15, 7.16, and 7.17.

EQUIPMENT	DESCRIPTION
Automated Guided Vehicle (AGV)	Material handling system with integration to conveyors, manufacturing, assembly stations and ASRS. Built in guidance and routing for material flow and obstacle sensing to avoid accidents.
Automatic Storage & Retrieval System (ASRS)	Transfer station will be provided to accept the pallet from the ASRS system. Transfer station to conveyor or AGV.
ARISTO XT ROBOT	Aristo is a 5 axis articulated robotic arm for doing various type of jobs like loading, unloading and handling the work piece conditions.
ASSEMBLY STATION	The station consists of linear conveyor, pick & place units, pneumatic process control for bearing and shaft assembly with Vision Inspection System.
FLEX TURN	• With SINUMERIK 828D Controller. • 8 tool programmable Hydraulic Automatic Tool changer.
FLEX MILL	• With SINUMERIK 828D Controller. • 8 Station programmable turret.

Figure 7.14: Details about Computer Computer-Integrated Manufacturing Lab

Figure 7.15: CNC Turning and Milling Simulators

Figure 7.16: CNC Milling and CNC Turning machines

Figure 7.17: An overview of the CIM lab with Sequence Planning, Process Planning, and Shop Floor Layout Generation

Table 7.7 hereunder provides a summary of the students along with the training programs they have completed at the SCoE.

Table 7.7: Summary of the training programs at SCoE during the last three years

Name of Activity/Event	Number of Participants	Program and Semester	Outcomes	Month/ Year
CNC Lathe Controller Training	16	One Day Skill Development Program	CNC Programming	Apr/25
CNC Milling Controller Training	12	One Day Skill Development Program	CNC Milling	Apr/25
CNC Lathe m/c & Controller Training	15	Five-Day Skill Development Program	CNC Lathe Machining	Dec/24
CNC Milling m/c & Controller Training	17	Five-Day Skill Development Program	CNC Milling Machining	Dec/24
CNC Machine & CAM	16	Five-Day Skill Development Program	CNC Machine & CAM	Jul/24
Basics of Modelling	13	Five-Day Skill Development Program	Basic of Modeling using NX	Jul/24
Basic Modeling using NX	11	Five-Day Skill Development Program	Basic of Modeling using NX	Dec/23
CNC Machine Fundamentals & Programming Basic	6	Five-Day Skill Development Program	CNC Programming and Machining	Jul/22
Basic Modeling & Assembly Using NX	24	Five-Day Skill Development Program	Modeling & Assembly using NX	Jul/22
Basic Modeling & Assembly Using NX	6	Five-Day Skill Development Program	Solid Modeling using NX	May/22
Modeling Tool for Additive Manufacturing	48	One Day Seminar	Case studies & live demo of how to use RE in AM	Apr/22
Structure & Assembly	7	Two-Day Skill Development Program	Solid Modeling using NX	May/22

5. Centre for Biofuels and Bioenergy Studies (CBBS)

The Centre for Biofuels and Bioenergy Studies (CBBS) is established to promote sustainable energy solutions through cutting-edge research, innovation, and skill development in the field of biofuels and bioenergy. It operates as a center of excellence for renewable fuels, including biodiesel, biogas, bio-jet fuels, and bio-based lubricants.

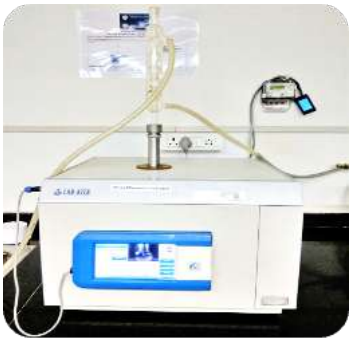
Objectives of the Centre:

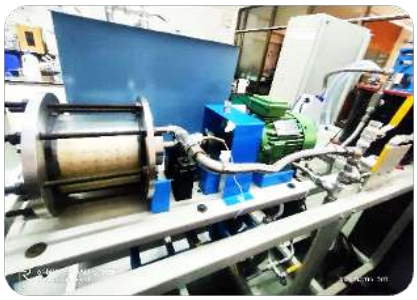
- Development and optimization of biodiesel production processes using Process Intensification (PI) techniques.

- Valorization of non-edible oils and waste cooking oils for renewable fuel production.
- Synthesis and characterization of bi-functional heterogeneous catalysts.
- Design and development of novel reactor systems, like hydrodynamic cavitation and shockwave reactors.
- Research in biomass conversion to advanced fuels such as aviation fuel and bio-lubricants.
- Skill development and capacity building through training programs.
- Multi-disciplinary collaboration on advanced materials and bioenergy applications.

Research Infrastructure and Facilities at the CBBS are shown in Table 7.8, and Figure 7.19 provides the instruments at CBBS.

Table 7.8: List of research equipment at the CBBS

	Ultrasound (US) Reactor · Developed at lab scale · Energy and cost-efficient · Suitable for small/medium-scale commercialization
	Hybrid (US+MW) Reactor · Scalability & continuous production study in progress · Energy & cost efficient · Suitable for medium-scale industrial applications · Applicable for a variety of feedstock · One single-step extraction and transesterification process
	Microwave (MW) Reactor · Developed at lab scale · Energy efficient · Suitable for small/medium-scale commercialization
	Hydrodynamic Cavitation (HC) Reactor · Developed at a 5 L batch size · Demonstration at Pilot plant scale planned (100 L) · Energy and cost-efficient · Suitable for pilot scale and large scale · Exploring startup opportunities
	Sequential Reactor · 20 L batch size · US (600 W) & MW (1000 W) · Maximize the heat and mass transfer rates · Suitable for commercialization at medium scale

	
	Shockwave Power Reactor · Designed & developed indigenously · Novel approach based on HC · Suitable for large-scale industrial applications · Techniques apply to a valid feedstock
	High-Speed Grinder · High-speed cutter facilities cavitation · Lowest activation energy & favorable process parameters · Cost-effective & environmentally friendly techniques
	Hydrodynamic Cavitation Reactor (Shell Project) · 100 L/batch Biodiesel production · Two-tank system for biodiesel production · Energy-efficient, cost-efficient, and environmentally friendly scalable approach

Cloud and pour Point Apparatus

Potentiometric Auto Titration

Oxidative Stability Test Unit

Vacuum Oven with Vacuum Pump

Constant Temperature Water Bath

Brookfield Viscometer

Figure 7.19: List of equipment at CBBS

The academic contribution of the CBBS is as follows.

Patent (Process/Product/Design)/Publications:

- Patents filed (12+3+4)
- International Journals (25 with high Impact Factor)
- Conferences (15)

Student Projects:

- Ph.D. (2 completed, 2 ongoing)
- M. Tech. (14)

Skill Development Program in CBBS

1. Total Batches: 11
2. Two batches in Summer and Two batches in Winter
3. Duration: 1 week
4. Total number of students who participated: 160+

Apart from this, Table 7.9 provides a summary of various events with the students from both PDUE and other participants across the state that the center has conducted.

Table 7.9: Bioenergy month celebration (February 2024)

Sr. No.	Event Name	Date	School/College Name	Number of students participating	Number of faculties participated
1.	Awareness of bioenergy among youth (school visit)	08/02/2024	Madhuri Mansukhalal Vasa Primary and High School	50	4
		12/02/2024	Kalol Taluka Kelavni Mandal (KTKM)	80	5
		17/02/2024	Narayana Higher Secondary School	60	4
		23/02/2024	M.B.Patel English Medium, Kadi	240	6
2.	CBBS Visit for external college students/guests	09/02/2024	L.D. College of Engineering, Ahmedabad	60	3
		20/02/2024	Central Institute of Petrochemicals Engineering & Technology (CIPET) Ahmedabad	60	3
		22/02/2024	Vishwakarma Government Engineering College, Ahmedabad	31	2
3.	Live demonstration on the 100 L shell biodiesel pilot plant	10/02/2024	PDEU	15	0
4.	Hands-on demonstration of biodiesel preparation	13/02/2024 & 20/02/2024	PDEU	30	2
5.	Exhibition of biofuel production techniques developed in CBBS	16/02/2024	PDEU	100	10
6.	Youth Energy Parliament (poster competition)	19/02/2024	PDEU	20	1
7.	National Science Day celebration	28/02/2024	PDEU	120	8

PART E: First Year faculty and financial Resources

(Data to be filled in for the first year course faculty and budget allocation and utilization)

E1. First Year Student-Faculty Ratio (FYSFR)

Table No. E1.1: FYSFR details.

Year	Sanctioned intake of all UG programs (S4)	No. of required faculty (RF4= S4/20)	No. of faculty members in Basic Science Courses & Humanities and Social Sciences including Management courses (NS1)	No. of faculty members in Engineering Science Courses (NS2)	Percentage= No. of faculty members ((NS1*0.8) + (NS2*0.2))/(No. of required faculty (RF4)); Percentage= ((NS1*0.8) + (NS2*0.2))/RF
2022-23(CAYm2)	1260	63	53	74	91

2023-24(CAYm1)	1260	63	52	84	93
2024-25(CAY)	1260	63	53	92	97

E2. Budget Allocation, Utilization, and Public Accounting at Institute Level

Table No. E2.1: Budget and actual expenditure incurred at Institute level.

Items	Budgeted in 2024-2025	Actual Expenses in 2024-2025 till	Budgeted in 2023-2024	Actual Expenses in 2023-2024 till	Budgeted in 2022-2023	Actual Expenses in 2022-2023 till	Budgeted in 2021-2022	Actual Expenses in 2021-2022 till
Infrastructure Built-Up	0	0	0	0	0	0	0	0
Library	400000	386088	300000	212235	500000	414779	800000	778229
Laboratory equipment	10000000	8973775	35000000	31411094	45000000	29720468	30000000	27012620
Teaching and non-teaching staff salary	435287859	431469648	382646493	380506831	464096234	477672498	368834147	368362630
Outreach Programs	0	0	0	0	0	0	0	0
R&D	0	15155925	0	17030936	0	46144484	0	41855764
Training, Placement and Industry linkage	9245734	6858263	9570788	6421698	9552692	9839510	7669459	7778712
SDGs	0	0	0	0	0	0	0	0
Entrepreneurship	0	0	0	0	0	0	0	0
Others (Laboratory Consumables,	564256675	544288535	523517175	456055962	553682358	528268924	416436068	330278587
Total	**1019190268**	**1007132234**	**951034456**	**891638756**	**1072831284**	**1092060663**	**823739674**	**776066542**

E3. Budget Allocation, Utilization, and Public Accounting at Program Specific Level

Table No. E3.1: Budget and actual expenditure incurred at program level.

Items	Budgeted in 2024-2025	Actual Expenses in 2024-2025 till	Budgeted in 2023-2024	Actual Expenses in 2023-2024 till	Budgeted in 2022-2023	Actual Expenses in 2022-2023 till	Budgeted in 2021-2022	Actual Expenses in 2021-2022 till
Laboratory equipment	6000000	5119939	25000000	22922640	10000000	5835483	20000000	18712860
Software	0	0	0	0	0	0	0	0
SDGs	0	0	0	0	0	0	0	0
Support for faculty development	0	0	0	0	0	0	0	0
R & D	0	2005881	0	2339484	0	5858556	0	6077240
Industrial Training, Industry expert,	1223670	907689	1314708	882128	1212821	1249235	1113566	1129429
Others (Library, Laboratory	74583397	72321174	72088251	63414006	70697857	67536702	61272328	48749880
Total	**81807067**	**80354683**	**98402959**	**89558258**	**81910678**	**80479976**	**82385894**	**74669409**