

## NATIONAL BOARD OF ACCREDITATION

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

<b>Program Name</b> : Biochemical Engineering	<b>Discipline</b> : Engineering & Technology
<b>Level</b> : Under Graduate	<b>Tier</b> : 1
<b>Application No</b> : 11148	<b>Date of Submission</b> : 06-11-2025

### PART A- Profile of the Institute

<b>A1. Name of the Institute:</b> HARCOURT BUTLER TECHNICAL UNIVERSITY	
Year of Establishment : 1921-1994	Location of the Institute: KANPUR
<b>A2. Institute Address:</b> NAWABGANJ, KANPUR-208002	
City:KANPUR	State:Uttar Pradesh
Pin Code:208002	Website:www.hbtu.ac.in
Email:vc@hbtu.ac.in	Phone No(with STD Code):0512-253400125340022
<b>A3. Name and Address of the Affiliating University (if any):</b>	
Name of the University :	City: Kanpur(Nagar)
State : Uttar Pradesh	Pin Code: 208002
<b>A4. Type of the Institution:</b> University	
<b>A5. Ownership Status:</b> State Government	

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

- No. of UG programs: **12**
- No. of PG programs: **6**

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	UG	Biochemical Engineering	1964	--	Biochemical Engineering
2	Engineering & Technology	PG	Biochemical Engineering	1966	--	Biochemical Engineering
3	Engineering & Technology	PG	Chemical Engineering	1960	--	Chemical Engineering
4	Engineering & Technology	UG	Chemical Engineering	1954	--	Chemical Engineering
5	Engineering & Technology	PG	Chemical Technology	1966	--	Oil Technology
6	Engineering & Technology	UG	Civil Engineering	1966	--	Civil Engineering
7	Engineering & Technology	PG	Computer Aided Design	2000	--	Mechanical Engineering
8	Engineering & Technology	UG	Computer Science and Engineering	1984	--	Computer Science and Engineering
9	Engineering & Technology	UG	Electrical Engineering	1965	--	Electrical Engineering
10	Engineering & Technology	UG	Electronics Engineering	1990	--	Electronics Engineering
11	Engineering & Technology	UG	Food Technology	1964	--	Food Technology
12	Engineering & Technology	PG	Food Technology	1966	--	Food Technology
13	Engineering & Technology	UG	Leather Technology	1978	--	Leather Technology
14	Engineering & Technology	PG	Masters in Computer Applications	1987	--	Computer Science and Engineering
15	Engineering & Technology	UG	Mechanical Engineering	1964	--	Mechanical Engineering
16	Engineering & Technology	UG	Oil Technology	1921	--	Oil Technology

17	Engineering & Technology	UG	Paint Technology	1964	--	Paint Technology
18	Engineering & Technology	UG	Plastics Technology	1964	--	Plastic Technology

**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
Biochemical Engineering	No	Biochemical Engineering	UG
Paint Technology	No	Paint Technology	UG
Oil Technology	No	Oil Technology	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
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## 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/COMPE AUTHORITY A DETAILS
1	Biochemical Engineering	UG	1964 / --	30	Yes	2022	51	2022	F.No. Northern/44643637092/2 Dated 20-Mar-2

Sanctioned Intake for Last Five Years for the Biochemical Engineering	
Academic Year	Sanctioned Intake
2025-26	51
2024-25	51
2023-24	51
2022-23	51
2021-22	30
2020-21	30

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 :	Lalit Kumar Singh
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)	2025-26 (CAY)	2024-25 (CAYm1)	2023-24 (CAYm2)	2022-23 (CAYm3)	2021-22 (CAYm4)	2020-21 (CAYm5)	2019-20 (CAYm6)
N=Sanctioned intake of the program (as per AICTE /Competent authority)	51	51	51	51	30	30	30
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	51	51	51	4	21	30	30

N2=Number of students admitted in 2nd year in the same batch via lateral entry including leftover seats	0	0	0	0	0	0	0
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	8	3	5	0	0	6	7
Total number of students admitted in the program (N1 + N2 + N3 + N4) - excluding those admitted through multiple entry and exit points.	59	54	56	4	21	36	37

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]
2025-26 (CAY)	51	51	8	115.69
2024-25 (CAYm1)	51	51	3	105.88
2023-24 (CAYm2)	51	51	5	109.80

Average  $[(ER1 + ER2 + ER3) / 3] = 110.46 \approx 100$

#### 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	(2021-22) LYG	(2020-21) LYGm1	(2019-20) 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).	30.00	30.00	37.00
B=No. of students who graduated from the program in the stipulated course duration	20.00	29.00	29.00
Success Rate (SR)= (B/A) * 100	66.67	96.67	78.38

Average SR of three batches  $((SR_1 + SR_2 + SR_3)/3)$ : 80.57

#### 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 ( 2024-25 )	CAYm2 ( 2023-24 )	CAYm3 ( 2022-23 )
X=(Mean of 1st 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 1st year/10)	6.30	6.06	6.29
Y=Total no. of successful students	44.00	48.00	4.00
Z=Total no. of students appeared in the examination	51.00	51.00	4.00
API $[X*(Y/Z)]$	5.43	5.70	6.29

Average API  $[(AP1+AP2+AP3)/3]$  : 5.81

#### 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 ( 2024-25 )	CAYm2 ( 2023-24 )	CAYm3 ( 2022-23 )
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)	6.32	6.69	6.97
Y=Total no. of successful students	41.00	4.00	21.00
Z=Total no. of students appeared in the examination	48.00	4.00	21.00
API $[X*(Y/Z)]$	5.40	6.69	6.97

Average API  $[(AP1 + AP2 + AP3)/3]$  : 6.35

#### 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 (2024-25)	CAYm2 (2023-24)	CAYm3 (2022-23)
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)	6.98	7.06	6.88

Y=Total no. of successful students	4.00	21.00	29.00
Z=Total no. of students appeared in the examination	4.00	21.00	29.00
API [ X*(Y/Z) ]:	6.98	7.06	6.88

Average API [ (AP1 + AP2 + AP3)/3 ] : 6.97

### B9. Placement, Higher Studies, and Entrepreneurship

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

Item	LYG (2021-22)	LYGm1(2020-21)	LYGm2(2019-20)
FS*=Total no. of final year students	30.00	30.00	30.00
X=No. of students placed	12.00	18.00	17.00
Y=No. of students admitted to higher studies	6.00	11.00	10.00
Z= No. of students taking up entrepreneurship	2.00	0.00	3.00
Placement Index(P) = ((X + Y + Z)/FS) * 100):	66.67	96.67	100.00

Average Placement Index = (P\_1 + P\_2 + P\_3)/3: 87.78 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 of Association (Regular/ Contract/ Ad hoc)	Current Associ (Y/N)
1	Lalit Kumar Singh	XXXXXXXX76J	Ph.D	IIT Roorkee	Fermentation Technology	03/02/2003	22.9	Lecturer	Professor	04/02/2019	Regular	Yes
2	Ajay Kumar Singh	XXXXXXXX43J	Ph.D	AKTU Lucknow	Bioinformatics	11/07/2024	1.3	Professor	Professor	11/07/2024	Regular	Yes
3	Brajesh Singh	XXXXXXXX43F	M.Tech	Jadavpur University, Kolkata	Bioprocess Engineering	04/10/1995	30.1	Lecturer	Associate Professor	04/10/1999	Regular	Yes
4	Sachin Kumar	XXXXXXXX43L	Ph.D	IIT Roorkee	Biofuel & Bioenergy	14/07/2025	0.3	Associate Professor	Associate Professor	14/07/2025	Regular	Yes
5	Rajkamal Kushwaha	XXXXXXXX44A	Ph.D	NIT Jalandhar	Waste Water Treatment, nanoparticle synthesis and characterization	13/07/2022	3.3	Assistant Professor	Assistant Professor		Regular	Yes
6	Roma Agrahari	XXXXXXXX41N	Ph.D	MNNIT Allahabad	Biomass conversion, Bioenergy, Waste Water Treatment	20/07/2022	3.3	Assistant Professor	Assistant Professor		Regular	Yes
7	Shravan Kumar	XXXXXXXX16D	Ph.D	IIT Guwahati	Waste Water Treatment, Biofuel	03/08/2022	3.2	Assistant Professor	Assistant Professor		Regular	Yes
8	Mohit Kumar Yadav	XXXXXXXX10H	M.Tech	NIT Durgapur	Nanotechnology, Food Packaging	21/09/2021	4.1	Assistant Professor	Assistant Professor		Contractual Fulltime	Yes
9	Pankaj Kumar Lodhi	XXXXXXXX35R	M.Tech	HBTI Kanpur	Chemical Engineering	03/08/2023	2.3	Assistant Professor	Assistant Professor		Contractual Fulltime	Yes

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 Department1

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

Description	CAY(2025-26)	CAYm1 (2024-25)	CAYm2 (2023-24)
UG1.B	51	51	51
UG1.C	51	51	30
UG1.D	51	30	30
<b>UG1: Biochemical Engineering</b>	<b>153</b>	<b>132</b>	<b>111</b>
PG1.A	12	12	12
PG1.B	12	12	12
<b>PG1: Biochemical Engineering</b>	<b>24</b>	<b>24</b>	<b>24</b>
DS=Total no. of students in all UG and PG programs in the Department	177	156	135
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)	<b>S1= 177</b>	<b>S2= 156</b>	<b>S3= 135</b>
DF=Total no. of faculty members in the Department	9	8	7
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)	<b>F1= 9</b>	<b>F2= 8</b>	<b>F3= 7</b>
FF=The faculty members in F who have a 100% teaching load in the first-year courses	0	0	0
Student Faculty Ratio (SFR)=S/(F-FF)	<b>SFR1= 19.67</b>	<b>SFR2= 19.50</b>	<b>SFR3= 19.29</b>
Average SFR for 3 years	<b>SFR= 19.49</b>		

### 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	$FQ = 2.5 \times [(10X + 4Y) / RF ]$
2025-26(CAY)	5	4	8.00	20.62
2024-25(CAYm1)	4	4	7.00	20.00
2023-24(CAYm2)	3	4	6.00	19.17

### C4. Faculty Cadre Proportion

- Faculty Cadre Proportion is 1(RF1): 2(RF2): 6(RF3)
- RF1= No. of Professors required =  $1/9 * \text{No. of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (S) as per C2 of this documents.}$
- RF2= No. of Associate Professors required =  $2/9 * \text{No. of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (S) as per section C2 of this documents.}$
- RF3= No. of Assistant Professors required =  $6/9 * \text{No. of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (S) as per section C2 of this documents.}$
- 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
2025-26	1.00	2.00	1.00	1.00	5.00	4.00

2024-25	1.00	2.00	1.00	0.00	5.00	4.00
2023-24	1.00	1.00	1.00	0.00	4.00	4.00
Average	RF1=1.00	AF1=1.67	RF2=1.00	AF2=0.33	RF2=4.67	AF2=4.00

#### 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)

(CAYm2)

(CAYm3)

#### C6. Academic Research

Table No. C6.1: Faculty publication details.

S.No.	Item	2024-25 (CAYm1)	2023-24 (CAYm2)	2022-23 (CAYm3)
1	No. of peer reviewed journal papers published	11	6	4
2	No. of peer reviewed conference papers published	2	1	0
3	No. of books/book chapters published	12	4	2

#### 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
Mr. Brajesh Singh	Prof. Lalit Kumar Singh	Department of Biochemical Engineering	Inspection of GPIs for Compliance Verification	CPCB	2024-25	5651217.00
						Amount received (Rs.):5651217.00

(CAYm2)

(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
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Inspection of GPIs for Compliance Verification	CPCB	2022-23	6343975.00
						Amount received (Rs.):6343975.00

**Total Amount (Lacs) Received for the Past 3 Years: 11995192.00**

**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)**

<b>PI Name</b>	<b>Co-PI names if any</b>	<b>Name of the Dept., where project is sanctioned</b>	<b>Project Title*</b>	<b>Name of the Funding agency</b>	<b>Duration of the project</b>	<b>Amount(Lacs) i.e. 15,25,000=15.25</b>
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Penza Tanning Inds Pvt. Ltd	22-08-2024	0.35
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Star Tannery	09-09-2024	0.35
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Universal Yarns & Tex Pvt. Ltd.	14-09-2024	0.35
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	J K Agro Industries	29-09-2024	0.30
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Saba Exports	09-10-2024	0.35
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Saba Exports	09-10-2024	0.35
						Amount received (Rs.):2.05

**(CAYm2)**

<b>PI Name</b>	<b>Co-PI names if any</b>	<b>Name of the Dept., where project is sanctioned</b>	<b>Project Title*</b>	<b>Name of the Funding agency</b>	<b>Duration of the project</b>	<b>Amount(Lacs) i.e. 15,25,000=15.25</b>
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	CPCB	2023-24	53.74
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Envirad Projects Pvt. Ltd.	26-04-2023	0.12
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Envirad Projects Pvt. Ltd.	31-05-2023	0.24
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Envirad Projects Pvt. Ltd.	04-08-2023	0.12
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Envirad Projects Pvt. Ltd.	18-09-2023	0.12
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Envirad Projects Pvt. Ltd.	23-10-2023	0.12
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Premier Tech Brisanzia Pvt. Ltd.	26-10-2023	0.30
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Sunny Impex	07-11-2023	0.30
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Pollucon Technologies Ltd.	03-03-2024	0.30
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	GTM Industries Pvt. Ltd.	20-04-2023	1.18
						Amount received (Rs.):56.54

(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
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Tirubala Exports (India) Pvt. Ltd.	30-05-2022	0.81
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Super Style Tanners Pvt. Ltd.	29-09-2022	0.47
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	RSA Dying & Trading Kanpur Dehat	20-01-2023	0.30
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Khalid Tanners Wajidpur Jajmau Kanpur	04-02-2023	0.30
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Indian Tannery	04-02-2023	0.30
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Aziz Leather Finishers	15-03-2023	0.35
Mr. Brajesh Singh	-	Department of Biochemical Engineering	Type-I Consultancy	Rajrani Cold Storage & Ice Plant	31-03-2023	0.47
						Amount received (Rs.):3.00

**Total amount (Lacs) received for the past 3 years: 61.59**

**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)

Faculty name	Project title/ Support for Activity	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25	Amount Utilized(Lacs) i.e. 15,25,000=15.25	Outcomes of the project
Dr. Rajkamal Kushwaha	Contingency for Ph.D. Research Work	1 year	0.20	0.20	2 book chapter published
Dr. Rajkamal Kushwaha	Contingency for Ph.D. Research Work	1 year	0.20	0.20	2 book chapter published
Dr. Shravan Kumar	Contingency for Ph.D. Research Work	1 year	0.20	0.20	1 research paper published
Dr. Shravan Kumar	Contingency for Ph.D. Research Work	1 year	0.20	0.20	1 research paper published
Dr. Shravan Kumar	Contingency for Ph.D. Research Work	1 year	0.20	0.20	1 book chapter published
Prof. Lalit Kumar Singh	Contingency for Ph.D. Research Work	1 year	0.20	0.20	1 research paper published
Prof. Lalit Kumar Singh	Contingency for Ph.D. Research Work	1 year	0.20	0.20	1 research paper published
Dr. Rajkamal Kushwaha	Contingency for M. Tech. Research Work	1 year	0.03	0.03	Presentation in Conference and 1 student graduated
Dr. Rajkamal Kushwaha	Contingency for M. Tech. Research Work	1 year	0.07	0.07	Presentation in Conference and 1 student graduated
Dr. Roma Agrahari	Contingency for M. Tech. Research Work	1 year	0.09	0.09	Presentation in Conference and 1 student graduated
Dr. Shravan Kumar	Research Work Presentation at International Conference CHEMCON-2024	4 days	0.12	0.11	Presentation in Conference
Dr. Roma Agrahari	Research Work Presentation at International Conference ASSET-2025	3 days	0.16	0.16	Presentation in Conference
Dr. Roma Agrahari	Research Work Presentation at International Conference HABIT-2025	3 days	0.09	0.09	Presentation in Conference
Dr. Rajkamal Kushwaha	Research Work Presentation at International Conference INDACON-2025	4 days	0.04	0.04	Presentation in Conference
Dr. Shravan Kumar	Research Work Presentation at International Conference INDACON-2025	4 days	0.04	0.04	Presentation in Conference
Dr. Roma Agrahari	Research Work Presentation at International Conference HABIT-2025	3 days	0.05	0.05	Presentation in Conference
Dr. Lalit Kumar Singh	Research Work Presentation at International Conference ICMB-2025	4 days	0.08	0.08	Presentation in Conference
Dr. Lalit Kumar Singh	Research Work Presentation at International Conference	3 days	0.10	0.10	Presentation in Conference
			Amount received (Rs.): 2.27		

(CAYm2)

Faculty name	Project title/ Support for Activity	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25	Amount Utilized(Lacs) i.e. 15,25,000=15.25	Outcomes of the project
Dr. Shravan Kumar	Research Work Presentation at International Conference CHEMCON-2023	4 days	0.12	0.12	Presentation in Conference
Dr. Lalit Kumar Singh	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.07	0.07	Presentation in Conference
Dr. Lalit Kumar Singh	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.07	0.07	Presentation in Conference
Dr. Shravan Kumar	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.07	0.07	Presentation in Conference
Dr. Shravan Kumar	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.07	0.07	Presentation in Conference
Dr. Rajkamal Kushwaha	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.04	0.04	Presentation in Conference
Dr. Rajkamal Kushwaha	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.04	0.04	Presentation in Conference
Dr. Rajkamal Kushwaha	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.04	0.04	Presentation in Conference
Dr. Shravan Kumar	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.11	0.11	Presentation in Conference
Dr. Rajkamal Kushwaha	Research Work Presentation at International Conference WARM-TH 2024	-	0.12	0.12	Presentation in Conference
Dr. Rajkamal Kushwaha	Research Work Presentation at International Conference CHEMCON 2023	4 days	0.06	0.06	Presentation in Conference
Dr. Rajkamal Kushwaha	Research Work Presentation at International Conference CHEM-TECHNOVA 2024	4 days	0.08	0.08	Presentation in Conference
Dr. Shravan Kumar	Research Work Presentation at International Conference CHEM-TECHNOVA 2024	4 days	0.06	0.06	Presentation in Conference
Dr. Shravan Kumar	Research Work Presentation at International Conference CHEM-TECHNOVA 2024	4 days	0.06	0.06	Presentation in Conference
Dr. Lalit Kumar Singh	Research Work Presentation at International Conference CHEM-TECHNOVA 2024	4 days	0.04	0.04	Presentation in Conference
			Amount received (Rs.): 1.05		

(CAYm3)

Faculty name	Project title/ Support for Activity	Duration of the project	Amount(Lacs) i.e. 15,25,000=15.25	Amount Utilized(Lacs) i.e. 15,25,000=15.25	Outcomes of the project
Dr. Roma Agrahari	Attending Workshop at SATHI-BHU	3 days	0.08	0.08	Learn analytical techniques
			Amount received (Rs.): 0.08		

Total amount (Lacs) received for the past 3 years : 3.40

## 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	Undergraduate Laboratory	20	Muffle Furnace Lab Centrifuge Colony Counter Autoclave Digital Conductivity Meter pH Meter	12	Mr. Akshay K	Research Asst	M.Sc. (Chem)
2	Postgraduate Laboratory	10	Tubular Furnace, Single Distillation Column Water Bath Electronic Washing Balance Analytical Model	8	Mr. Akshay K	Research Asst	M.Sc. (Chem)

3	Research Lab- Food Biotechnology Lab	5	Single Distillation Column Water Bath Electronic Weighing Balance	16	Mr. Akshay K	Research Asst	M.Sc. (Chem)
4	Research Lab- Fermentation Lab	5	UV-Visible Spectrophotometer Single Distillation Column Water Bath Electronic Weighing Balance	16	Mr. Akshay K	Research Asst	M.Sc. (Chem)

## D2. Safety Measures in Laboratories

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

Sr. No	Laboratory Name	Safety Measures
1	Undergraduate Laboratories	<ul style="list-style-type: none"> <li>• Display of laboratory safety rules, Do's &amp; Don'ts and emergency contact information</li> <li>• Availability of appropriate fire extinguishers at accessible locations</li> <li>• Mandatory use of personal protective equipment (lab coats, gloves, safety goggles)</li> <li>• Proper earthing, MCB/ELCB protection and safe electrical fittings</li> <li>• Clearly marked emergency exits and unobstructed movement pathways</li> <li>• Safe storage and labeling of chemicals as per institutional norms</li> <li>• Continuous supervision by faculty and technical staff during practical sessions</li> </ul>
2	Postgraduate Laboratories	<ul style="list-style-type: none"> <li>• Instrument-specific SOPs and safety instructions displayed near advanced equipment</li> <li>• Restricted access to authorized and trained users only</li> <li>• UPS and voltage stabilizers for sensitive instruments to prevent electrical hazards</li> <li>• Adequate ventilation and exhaust systems for safe handling of chemicals and solvents</li> <li>• Availability of first-aid kits and spill control materials</li> <li>• Regular inspection of gas lines, pressure regulators and electrical connections</li> </ul>
3	Research Laboratories (Including Fermentation Laboratory)	<ul style="list-style-type: none"> <li>• Biosafety guidelines and emergency procedures prominently displayed</li> <li>• Controlled access limited to trained research scholars and faculty</li> <li>• Mandatory use of PPE and aseptic practices during microbial and fermentation operations</li> <li>• Use of laminar air flow units for inoculation and sampling activities</li> <li>• Autoclaves for sterilization of media, glassware and biological waste prior to disposal</li> <li>• Safe handling protocols for pressurized fermenters, rotating equipment and gas cylinders</li> <li>• Emergency power backup for critical fermentation and control systems</li> <li>• Continuous supervision by faculty members during experimental operations</li> </ul>

## D3. Project Laboratory/Research Laboratory

The Department of Biochemical Engineering has established well-defined project and research laboratory facilities to support undergraduate and postgraduate projects, doctoral research, innovation activities, and technology-oriented problem solving in the domains of bioprocess engineering, fermentation technology, enzyme technology, food and environmental biotechnology, and bioproduct development. These laboratories function as focused research and project support facilities and contribute to the department's research ecosystem, innovation culture, and industry relevance.

#### Research and Project Laboratory Facilities

The department's research laboratories, including the Fermentation Research Laboratory and allied advanced laboratories, provide an enabling environment for experimental research and project execution. These laboratories are equipped with modern bioprocessing, analytical, and characterization facilities that support both fundamental investigations and applied research in biochemical engineering.

The facilities enable activities such as microbial cultivation, enzyme production, fermentation process development, downstream processing, biochemical analysis, and environmental biotechnology studies. The laboratories are regularly utilized by B.Tech., M.Tech., and Ph.D. students, as well as faculty members, for academic projects, research dissertations, and sponsored research work.

#### Support for Student Projects and Research

The research laboratories provide structured support for:

- Undergraduate minor and major projects
- Postgraduate dissertation work
- Doctoral research and faculty-led research projects

Students undertake project work involving process optimization, scale-up studies, bioprocess monitoring, fermentation kinetics, enzyme activity analysis, and bio-product evaluation. Faculty supervision, access to advanced experimental setups, and research mentoring ensure high-quality project outcomes, technical documentation, and scholarly outputs.

#### Role in Advanced Research and Centre of Excellence-Type Activities

The project and research laboratories act as core research facilities for advanced experimentation and skill development. These laboratories support:

- Training in modern bioprocessing and analytical techniques
- Exposure to research methodologies and experimental design
- Collaborative research involving interdisciplinary themes such as bioenergy, waste valorization, biopharmaceuticals, and sustainable bioprocesses
- Academic discussions, demonstrations, and research-based learning beyond routine coursework

Through these activities, the laboratories contribute effectively to the department's long-term vision of developing research competence and industry-ready graduates.

#### Contribution to Innovation and Entrepreneurial Orientation

The research laboratories also facilitate innovation-driven project work by providing infrastructure for:

- Proof-of-concept development
- Process feasibility and optimization studies
- Prototype-level experimentation
- Validation of bioprocess parameters and product performance

Students are encouraged to translate project outcomes into innovative solutions, addressing challenges related to sustainable processing, bio-based products, and environmental management. Faculty mentoring further supports the development of research-based innovation and startup-oriented thinking among students.

#### Outcomes and Impact

The project and research laboratory facilities have contributed significantly to:

- Successful completion of UG, PG, and Ph.D. research projects
- Development of research aptitude and experimental competence among students
- Publications, technical reports, and conference presentations
- Industry-relevant problem-solving and applied research
- Strengthening innovation culture and employability of graduates

Overall, the project and research laboratories of the Department of Biochemical Engineering play a vital role in supporting academic projects, research excellence, and innovation-oriented activities, thereby complementing the department's teaching-learning processes and research objectives.

## 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
2023-24(CAYm2)	645	32	14	8	40
2024-25(CAYm1)	645	32	20	20	62

2025-26(CAY)	645	32	23	32	78
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## 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	1700	1600.2	1279.52	1267.74	641.38	641.38	500	163.04
Library	100	3.86	50	28.14	146	76.79	100.92	70.19
Laboratory equipment	700	429.85	300	213.03	500	104.79	500	163.04
Teaching and non-teaching staff	6178.38	3551.74	5408.06	4579.02	5163	2654.37	4982	4135.14
Outreach Programs	15	3.32	0	0	0	0	0	0
R&D	100	18.42	100	22.95	102.40	48.09	116.38	54.70
Training, Placement and	110	61.35	75	32.12	90	70.97	90	25.66
SDGs	3	3	0	0	0	0	0	0
Entrepreneurship	6.5	5	0	0	0	0	0	0
Others, specify	1425	900.95	550	532.21	300	246.64	250	236.42
<b>Total</b>	<b>10337.88</b>	<b>6577.69</b>	<b>7762.58</b>	<b>6675.21</b>	<b>6942.78</b>	<b>3843.03</b>	<b>6539.30</b>	<b>4848.19</b>

## 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	1500000	779766	1500000	1440166	800000	792647	600000	81598
Software	500000	0	500000	0	400000	0	400000	0
SDGs	200000	18180	200000	81584	50000	32050	30000	0
Support for faculty development	1000000	100000	1000000	200000	250000	500000	70000	0
R & D	1000000	135925	1000000	305884	300000	196749	200000	12000
Industrial Training, Industry expert,	500000	98762	500000	102596	200000	173620	200000	40268
Miscellaneous Expenses*	300000	145477	300000	286349	200000	112372	300000	227120
<b>Total</b>	<b>5000000</b>	<b>1278110</b>	<b>5000000</b>	<b>2416579</b>	<b>2200000</b>	<b>1807438</b>	<b>1800000</b>	<b>360986</b>