

**PO Attainment**

Faculty Name:

Akhilesh Kumar Pandey

Class/Sem:

B.Tech. Biotech VI Academic Year: 2022-23

Course Name:

Bioreactor Design and Analysis

Course Code:

BBT 603

Program Name: B.Tech Biotech

**CO-PO MAPPING:**

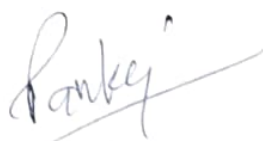
Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2			2	1	2	2			
CO2	2	1	1		2		1	2		1	1	1
CO3	2		2	1	3	1	2		2		1	
CO4	2		1	2			2	1			2	
CO5	3	1		3	2		1	1		2		2
CO6	2	1		3	1	2					2	1

**CO ATTAINMENT:**

Akhilesh Kumar Pandey	Att. Level
CO1	3.00
CO2	3.00
CO3	3.00
CO4	3.00
CO5	3.00
CO6	3.00

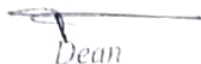
**PO ATTAINMENT:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Overall PO Attainment	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0



Head

Department of Biotechnology  
Invertis University, Bareilly (U.P.)



Dean

Faculty of Science  
Invertis University, Bareilly (U.P.)



Faculty Signature



Registrar  
Invertis University  
Bareilly

Faculty Name: Akhilesh Kumar Pandey

Class/Sem: B.Tech. Biotech VI sem Academic Year: 2022-23

Course Name: Bioreactor Design and Analysis

Course Code: BBT-603

Program Name: B.Tech. Biotech

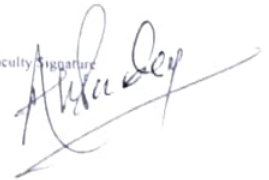
S. No.	University Reg. No.	Student Name	Internal Marks Scheme						Total Internal Marks	End Sem Exam Marks	Total Marks			
			First Unit Test	Second Unit Test	First Class Test	Second Class Test	Best One From Unit Test	Best One From Class Test				Unit Test(UT)	Attendance(AT)	Teacher Assessment(TA)
			Theory (30)	Theory (30)	Theory (10)	Theory (10)	Theory (30)	Theory (10)				Theory (30)	Theory (70)	Theory (100)
1	BBT2020001	SHREYA SHARMA	30	24	10	8	30	10	12	12	6	30	57	87
2	BBT2020004	AKSHAT SAXENA	30	24	7	5	30	7	12	13	4	29	51	80
3	BBT2020005	VEDIKA SHARMA	30	24	7	5	30	7	12	13	4	29	50	79
4	BBT2020006	NAJIM KHAN	20	16	3	3	20	3	8	8	2	18	35	53
5	BBT2020007	ANCHAL DIXIT	30	24	10	8	30	10	12	12	6	30	59	89
6	BBT2020008	KASHISH FATIMA	30	24	7	5	30	7	12	13	4	29	58	87
7	BBT2020009	PRANJAL MISHRA	30	24	7	5	30	7	12	13	4	29	46	75
8	BBT2020010	MOHD SUHAIL ULLAH KHAN							12	12	4	28	47	75
Students appeared for the examination			7	7	7	7	7	7	8	8	8	22	8	8
Target / satisfactory mark set as benchmark			12	12	4	4	12	4	5	5	2	12	28	40
Students scored above the target set			7	7	6	6	7	6	8	8	7	12	8	8
% Students scored above the target set			100%	100%	86%	86%	100%	86%	100%	100%	88%	18	100%	100%
Attainment Level			3	3	3	3	3	3	3	3	3	15	3	3

	CO1	CO2	CO3	CO4	CO5	CO6	Overall
CO1	3		3		3	3	3.00
CO2	3		3		3	3	3.00
CO3	3			3	3	3	3.00
CO4		3		3	3	3	3.00
CO5		3		3	3	3	3.00
CO6		3		3	3	3	3.00

Rubric:	
% Students	Level
<50%	1
50-75%	2
>75%	3

Overall attainment 3.00

Faculty Signature




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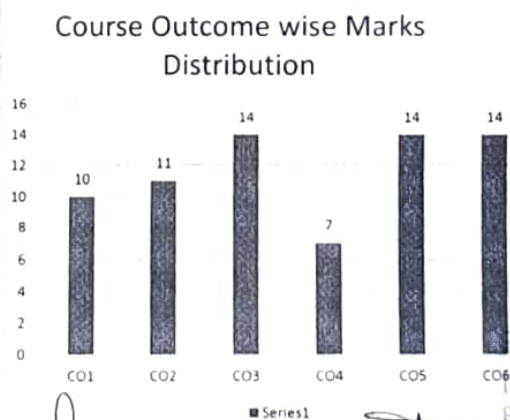
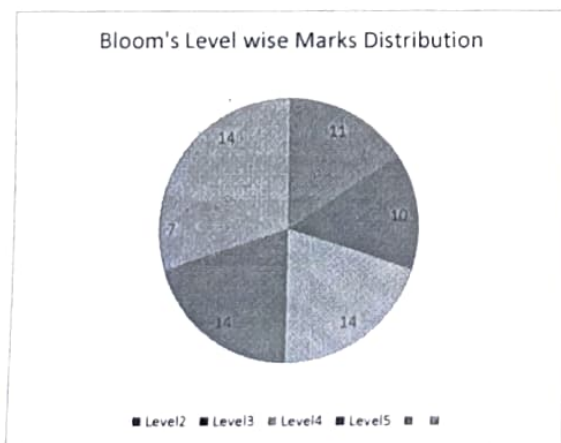
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Q.No	Questions	Marks (70)	CO	BL
<b>Explain the following:</b>				
1-I	Impellar	01	CO1	L2
1-II	Baffles	01	CO2	L1
1-III	Growth rate	01	CO2	L2
1-IV	Bioreactor	01	CO2	L1
1-V	pH control	01	CO2	L1
1-VI	Diffusivity	01	CO1	L1
1-VII	Convection	01	CO1	L1
<b>Explain the following:</b>				
2-I	Fermenter	01	CO1	L1
2-II	Sterlization	01	CO1	L1
2-III	Aeration	01	CO1	L1
2-IV	Agitation	01	CO1	L2
2-V	Antifoaming agents	01	CO1	L1
2-VI	Fermentation	01	CO1	L1
2-VII	Body construction materials	01	CO1	L1
3-I	Discuss the Fixed bed Bioreactors	7	CO2	L2
3-II	Write a notes on sterilization	7	CO3	L3
4-I	Explain Dimensionless number	7	CO3	L5
4-II	Explain plug flow bioreactors	7	CO4	L3
5	Discuss body construction of bioreactor	14	CO5	L4
6	Explain gas liquid mass transfer in bioreactor	14	CO6	L6

BL – Bloom's Taxonomy Levels  
 (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)  
 CO – Course Outcomes PO – Program Outcomes; PI Code – Performance Indicator Code

Level	Marks	CO	Marks
Level1	11	CO1	10
Level2	10	CO2	11
Level3	14	CO3	14
Level4	14	CO4	7
Level5	7	CO5	14
Level6	14	CO6	14
<b>Total</b>	<b>70</b>	<b>Total</b>	<b>70</b>

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 Registrar  
 Invertis University  
 Bareilly

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 Head  
 Department of Biotechnology  
 Invertis University Bareilly (U.P.)

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 Dean  
 Faculty of Science  
 Invertis University, Bareilly (U.P.)

First Unit Test 2022-23



B.Tech. Biotech - VI Semester

Course/Code: Bioreactor Design and Analysis (BBT-603)

Maximum Marks :30; Duration: 90 Minutes

Q.No	Questions	Marks (30)	CO	BL
	<b>Explain the following in very short -</b>			
1-I	Define the fermenter	01	CO1	L1
1-II	Explain role of sparger	01	CO1	L1
1-III	_____ is the best method of sterilization.	01	CO2	L2
1-IV	Types of steel used in making bioreactor are.....	01	CO1	L2
1-V	Define fermentation	01	CO1	L1
	<b>Expalin the following</b>			
2-I	Impellar	01	CO2	L2
2-II	Baffles	01	CO2	L1
2-III	Materials	01	CO2	L2
2-IV	Vortex	01	CO2	L2
2-V	Batch reactor	01	CO2	L1
3	Explain the air lift fermenter and its advantage and disadvantages	08	CO2	L3
4-A	Define the batch culture bioreactor in detail	06	CO3	L4
4-B	Explain continuous stirred tank reactor	06	CO3	L4

BL – Bloom's Taxonomy Levels

(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

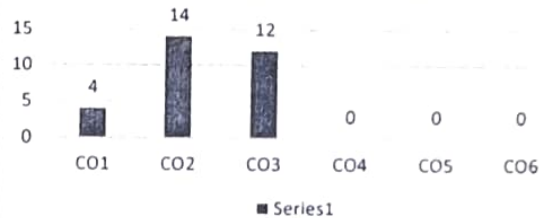
CO – Course Outcomes PO – Program Outcomes; PI Code – Performance Indicator Code

Level	Marks	CO	Marks
Level1	5	CO1	4
Level2	5	CO2	14
Level3	8	CO3	12
Level4	12	CO4	0
Level5	0	CO5	0
Level6	0	CO6	0
<b>Total</b>	<b>30</b>	<b>Total</b>	<b>30</b>

Bloom's Level wise Marks Distribution



Course Outcome wise Marks Distribution



*Parkey*  
Head

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*Dean*

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*Arshad*

*Registrar*  
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Q.No	Questions	Marks (30)	CO	BL
	<b>Explain the following in very short -</b>			
1-I	Define batch bioreactor	01	CO4	L1
1-II	Explain valve	01	CO4	L1
1-III	Define mass transfer	01	CO4	L2
1-IV	Define packed bed bioreactors	01	CO4	L1
1-V	Define fluidized bed bioreactor	01	CO4	L1
	<b>Explain the following -</b>			
2-I	Air lift fermentor	01	CO4	L2
2-II	Viscosity	01	CO5	L2
2-III	Diffusion	01	CO5	L2
2-IV	Ficks law	01	CO5	L2
2-V	Osmosis	01	CO5	L2
3	Explain the volumetric mass transfer and their coefficient	08	CO5	L3
4-A	Derive an equation for gas liquid transfer	12	CO6	L4

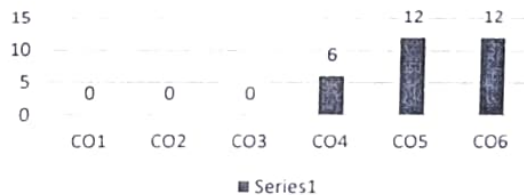
BL – Bloom’s Taxonomy Levels  
(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)  
CO – Course Outcomes PO – Program Outcomes; PI Code – Performance Indicator Code

Level	Marks	CO	Marks
Level1	4	CO1	0
Level2	6	CO2	0
Level3	8	CO3	0
Level4	12	CO4	6
Level5	0	CO5	12
Level6	0	CO6	12
<b>Total</b>	<b>30</b>	<b>Total</b>	<b>30</b>

Bloom's Level wise Marks Distribution



Course Outcome wise Marks Distribution



*Pandey*  
Head

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*Dean*  
Dean

Faculty of Science  
Invertis University, Bareilly (U.P.)

*Auladey*

*SK*

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Q.No	Questions	Marks (10)	CO	BL
1	Define Bioreactors and their types	05	CO1	L3
2	Discuss air lift fermentor	05	CO2	L1

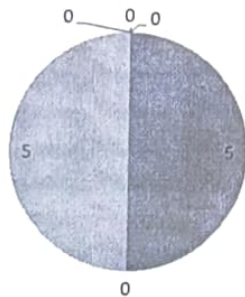
BL – Bloom's Taxonomy Levels

(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

CO – Course Outcomes PO – Program Outcomes; PI Code – Performance Indicator Code

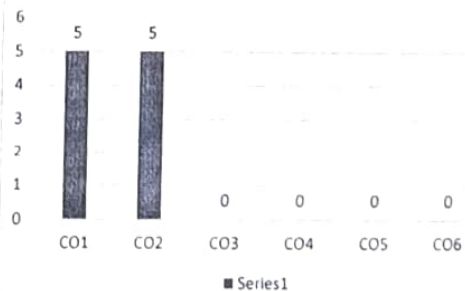
Level	Marks	CO	Marks
Level1	5	CO1	5
Level2	0	CO2	5
Level3	5	CO3	0
Level4	0	CO4	0
Level5	0	CO5	0
Level6	0	CO6	0
<b>Total</b>	<b>10</b>	<b>Total</b>	<b>10</b>

Bloom's Level wise Marks Distribution



Legend: Level1, Level2, Level3, Level4, Level5, Level6

Course Outcome wise Marks Distribution



*Pankaj*  
Head

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*[Signature]*  
Dean

Faculty of Science  
Invertis University, Bareilly (U.P.)

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PROGRAM : BACHELOR OF TECHNOLOGY (BIO TECHNOLOGY)  
SEMESTER : SIXTH  
SESSION : 2022-23  
COLLEGE : Faculty of Bio Science & Bio Technology

Enrollment No.	Roll No.	Student Name	Student ID	BBT601			BBT602			BBT603			BBT604			BBT605			BBT651			BBT652			GP601			Grand Total	Credit Secured	SG										
				Max Marks			Max Marks			Max Marks			Max Marks			Max Marks			Max Marks			Max Marks			CR	CR	CR													
				E	I	T	E	I	T	E	I	T	E	I	T	E	I	T	E	I	T	E	I	T							E	I	T	E	I	T				
1	204199	SHREYA SHARMA	BFT2020001	49	28	77	4	70	30	100	4	70	30	100	4	70	30	100	4	70	30	100	4	35	15	50	2	15	15	50	2	50	50	2	50	50	2	650	26	0.1
2	204201	AKSHAT SAXENA	BFT2020004	40	28	68	4	66	30	96	4	66	26	92	4	59	29	88	4	28	12	40	2	34	14	48	2	43	43	2	43	43	2	571	26	0.1				
3	204202	VEDIKA SHARMA	BFT2020005	47	28	75	4	54	30	84	4	50	29	79	4	64	25	89	4	53	28	81	4	25	10	35	2	30	12	42	2	40	40	2	40	40	2	515	26	0.1
4	204203	ANJAL DIXIT	BFT2020007	37	18	55	4	35	18	53	4	34	18	52	4	42	18	60	4	21	9	30	2	31	13	44	2	41	41	2	41	41	2	528	26	0.1				
5	204204	KASHISH FATIMA	BFT2020008	43	28	71	4	65	30	95	4	59	30	89	4	66	30	96	4	57	30	87	4	25	11	36	2	35	15	50	2	43	43	2	43	43	2	567	26	0.1
6	204205	PRAANJAL MISHRA	BFT2020009	43	28	71	4	62	29	91	4	58	29	87	4	63	28	91	4	54	28	82	4	25	11	36	2	33	13	46	2	41	41	2	41	41	2	545	26	0.1
7	204206	MOHD. SURAIL	BFT2020010	35	28	63	4	51	29	80	4	46	29	75	4	58	18	76	4	51	28	79	4	25	10	35	2	32	13	45	2	40	40	2	40	40	2	501	26	0.1
8	204207	ULLAH KHAN	BFT2020011	35	28	63	4	51	27	78	4	47	28	75	4	55	25	80	4	48	28	76	4	24	10	34	2	33	13	46	2	41	41	2	41	41	2	403	26	0.1

*[Signature]*  
Head  
Department of Biotechnology,  
Invertis University, Bareilly, U.P.

*[Signature]*  
Dean  
Faculty of Science  
Invertis University, Bareilly, U.P.

Registrar  
Invertis University  
Bareilly

Vice Chancellor

Registrar  
Invertis University  
Bareilly

Registrar

Controller of Examination

\* CPI of Re-Appear Students are not Calculated.  
Passing marks - 40% in each course

Legend:-  
- External Marks I - Internal Marks  
- Total Marks  
Date : Jun 27, 2023  
Passed with Gross Marks  
B-Credit

BBT602 - INTELLECTUAL PROPERTY RIGHT BIOETHICS AND  
BBT604 - PROJECT MANAGEMENT AND PAPER WRITING  
BBT605 - BIOREACTOR DESIGN AND ANALYSIS  
BBT651 - PLANT BIOTECHNOLOGY LAB