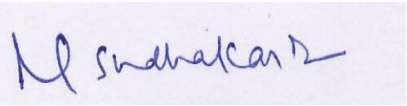
THAPAR INSTITUTE
OF ENGINEERING & TECHNOLOGY
(Deemed to be University)

THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BIOTECHNOLOGY

- **Sample Survey Form for Feedback from Alumni**
- **Procedure to Calculate CO, PO and PSO**
- **Feedback Forms filled by Alumni**
- **Feedback Forms filled by Employer**
- **Feedback Forms filled by Graduating Students**
- **Feedback Forms filled by Parents**
- **Analysis of Feedbacks Received and Action Taken Report**



Thapar Institute of Engineering & Technology

1.4.1

1.4.1 Structured feedback received from 1) Students, 2) Teachers, 3) Employers, 4) Alumni 5) Parents for design and review of syllabus

N Sudhakar

Survey form to assess the level of attainment of program outcomes – Alumni

Dear Alumni,

It is wonderful to connect with you after few years. We hope you have been doing exceedingly well in your career. We are sure that your stay at TIET has enabled you to imbibe the process of lifelong learning and to take up challenging careers. We are sure you were sufficiently equipped not only to take the real world but also make it a better place to live in through responsible and innovative use of technology. We need your support to keep TIET flag flying high.

We solicit your feedback on attainment of the student outcomes (the knowledge, skills and attitude that you developed during the course of study at TIET and subsequent work experience) of biotechnology programme. Please answer the following questions on a scale of 1 to 5 where 1 indicates little achievement or skill, and 5 indicates great deal of achievement.

Survey questionnaire		Level of attainment (answer on a scale of 1 to 5)		
	I attained	Your employment experience	TIET preparation	Overall
1	Skills to apply the knowledge of biology and engineering principles of life sciences.	4	4	4
2	An ability to design and conduct experiments as well as to analyze and interpret data.	3	3	3
3	An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability of biotechnological processes.	4	4	4
4	An ability to function in multidisciplinary teams.	4	3	3.5
5	An ability to identify, formulate and solve engineering aspects in biotechnology.	3	4	3.5
6	An understanding of professional and ethical responsibility.	4	4	4
7	An ability to communicate effectively.	4	4	4
8	A knowledge of contemporary issues.	4	4	4
9	A recognition of the need for, and an ability to engage in lifelong learning.	4	2	3
10	The broad education necessary to understand the impact of biotechnological solutions in global, economic, environmental and societal context.	3	4	3.5

Note: Cross-out whichever not applicable

1) GATE exam after B.Tech: ~~passed/failed/not taken~~
2) Promotion since graduation: yes/~~no~~
3) Enrollment in higher studies: ~~yes~~/no, if yes answer following
   i) Name of programme_____ ii) Year of completion _____
4) Involvement in professional societies as a NA
5) Community service, if any NA
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives : ~~Excellent~~/Very good/~~Good/Average/Poor~~

Name with signature: Arun Gupta Your current organization: Roots Analysis

Regd no. 701100007 Year of graduation 2015

Survey form to assess the level of attainment of program outcomes – Alumni

Dear Alumni,

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3	An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability of biotechnological processes.	4	3	3
4	An ability to function in multidisciplinary teams.	5	4	5
5	An ability to identify, formulate and solve engineering aspects in biotechnology.	3	4	4
6	An understanding of professional and ethical responsibility.	5	5	5
7	An ability to communicate effectively.	5	5	5
8	A knowledge of contemporary issues.	4	4	4
9	A recognition of the need for, and an ability to engage in lifelong learning.	5	5	5
10	The broad education necessary to understand the impact of biotechnological solutions in global, economic, environmental and societal context.	4	4	4

Note: Cross-out whichever not applicable

1) GATE exam after B.Tech: passed/failed/not taken (not taken)
2) Promotion since graduation: yes/no (Yes)
3) Enrollment in higher studies: yes/no. if yes answer following
   i) Name of programme : PGDM, NMIMS ii) Year of completion 2020_____
4) Involvement in professional societies as a Manager_____
5) Community service, if any Environment Related Activities _____
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives : Excellent/Very good/Good/Average/Poor (Very Good)

Name with signature : Rhythm Aggarwal Your current organization : Persuing Higher Studies

Regd no. 701100045_____ Year of graduation : 2015 ___

Survey form to assess the level of attainment of program outcomes – Alumni

Dear Alumni,

It is wonderful to connect with you after few years. We hope you have been doing exceedingly well in your career. We are sure that your stay at TIET has enabled you to imbibe the process of lifelong learning and to take up challenging careers. We are sure you were sufficiently equipped not only to take the real world but also make it a better place to live in through responsible and innovative use of technology. We need your support to keep TIET flag flying high.

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	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)		
	I attained	Your employment experience	TIET preparation	Overall
1	Skills to apply the knowledge of biology and engineering principles of life sciences.	4	4	8
2	An ability to design and conduct experiments as well as to analyze and interpret data.	3	3	6
3	An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability of biotechnological processes.	3.5	3.5	7
4	An ability to function in multidisciplinary teams.	4	4	8
5	An ability to identify, formulate and solve engineering aspects in biotechnology.	3.5	3.5	7
6	An understanding of professional and ethical responsibility.	3	3	6
7	An ability to communicate effectively.	4	4	8
8	A knowledge of contemporary issues.	3	3	6
9	A recognition of the need for, and an ability to engage in lifelong learning.	3.5	3.5	7
10	The broad education necessary to understand the impact of biotechnological solutions in global, economic, environmental and societal context.	4	4	8

Note: Cross-out whichever not applicable

1) GATE exam after B.Tech: passed/failed/not taken
2) Promotion since graduation: yes/no N.A
3) Enrollment in higher studies: yes/no. if yes answer following
   i) Name of programme PhD ii) Year of completion 2019
4) Involvement in professional societies as a N.A
5) Community service, if any N.A
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives : Excellent/Very good/Good/Average/Poor

Name with signature Tejishree Singla Your current organization TIET

Regd no. 9015/4005 Year of graduation 2013

Survey form to assess the level of attainment of program outcomes – Alumni

Dear Alumni,

It is wonderful to connect with you after few years. We hope you have been doing exceedingly well in your career. We are sure that your stay at TIET has enabled you to imbibe the process of lifelong learning and to take up challenging careers. We are sure you were sufficiently equipped not only to take the real world but also make it a better place to live in through responsible and innovative use of technology. We need your support to keep TIET flag flying high.

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3	An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability of biotechnological processes.	4	4	4
4	An ability to function in multidisciplinary teams.	3	4	3.5
5	An ability to identify, formulate and solve engineering aspects in biotechnology.	4	5	4.5
6	An understanding of professional and ethical responsibility.	4	4	4
7	An ability to communicate effectively.	5	4	4.5
8	A knowledge of contemporary issues.	4	4	4
9	A recognition of the need for, and an ability to engage in lifelong learning.	5	4	4.5
10	The broad education necessary to understand the impact of biotechnological solutions in global, economic, environmental and societal context.	5	5	5

Note: Cross-out whichever not applicable

1) GATE exam after B.Tech: passed/~~failed/not taken~~
2) Promotion since graduation: ~~yes~~/no
3) Enrollment in higher studies: yes/no. if yes answer following
   i) Name of programme PhD ii) Year of completion 2021
4) Involvement in professional societies as a _____
5) Community service, if any _____
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives : Excellent/Very good/Good/Average/Poor

Name with signature Davinder Singh Your current organization TIET, Patiala

Regd no. 70110000/0 Year of graduation 2015

7) Suggestions, if any

Survey form to assess the level of attainment of program outcomes – Alumni

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4	An ability to function in multidisciplinary teams.	5	5	10
5	An ability to identify, formulate and solve engineering aspects in biotechnology.	4	4	8
6	An understanding of professional and ethical responsibility.	4	4	8
7	An ability to communicate effectively.	4	4	8
8	A knowledge of contemporary issues.	4	4	8
9	A recognition of the need for, and an ability to engage in lifelong learning.	5	5	10
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Note: Cross-out whichever not applicable

1) GATE exam after B.Tech: passed/failed/not taken
2) Promotion since graduation: yes/no - NA
3) Enrollment in higher studies: yes/no. if yes answer following
   i) Name of programme M.Tech ; PhD ii) Year of completion 2017 ; Pursuing
4) Involvement in professional societies as a NA
5) Community service, if any NA
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives : Excellent/Very good/Good/Average/Poor

Name with signature Harleen Kaur Walia Harleen Your current organization NA

Regd no. 701100016 Year of graduation 2015

7) Suggestions, if

Survey form to assess the level of attainment of program outcomes – Alumni

Dear Alumni,

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Note: Cross-out whichever not applicable

1) GATE exam after B.Tech: passed/failed/not taken
2) Promotion since graduation: yes/no N.A
3) Enrollment in higher studies: yes/no. if yes answer following
   i) Name of programme Ph.D ii) Year of completion 2019
4) Involvement in professional societies as a N.A
5) Community service, if any N.A
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives - Excellent/Very good/Good/Average/Poor

Name with signature

Survey form to assess the level of attainment of program outcomes – Alumni

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Note: Cross-out whichever not applicable

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2) Promotion since graduation: ~~yes~~/no
3) Enrollment in higher studies: yes/no. if yes answer following
   i) Name of programme PhD ii) Year of completion 2021
4) Involvement in professional societies as a _____
5) Community service, if any _____
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives : Excellent/Very good/Good/Average/Poor

Name with signature Davinder Singh

Survey form to assess the level of attainment of program outcomes – Alumni

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Note: Cross-out whichever not applicable

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4) Involvement in professional societies as a NA
5) Community service, if any NA
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Name with signature [illegible]

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6	An understanding of professional and ethical responsibility.	4	4	4
7	An ability to communicate effectively.	4	4	4
8	A knowledge of contemporary issues.	4	4	4
9	A recognition of the need for, and an ability to engage in lifelong learning.	4	2	3
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Note: Cross-out whichever not applicable

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2) Promotion since graduation: yes/~~no~~
3) Enrollment in higher studies: ~~yes~~/no. if yes answer following
   i) Name of programme_____ ii) Year of completion _____
4) Involvement in professional societies as a __NA__
5) Community service, if any __NA__
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives : ~~Excellent~~/Very good/~~Good/Average/Poor~~

Name with signature: Arun Gupta Your current organization: Roots Analysis

Survey form to assess the level of attainment of program outcomes – Alumni

Dear Alumni,

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7	An ability to communicate effectively.	5	5	5
8	A knowledge of contemporary issues.	4	4	4
9	A recognition of the need for, and an ability to engage in lifelong learning.	5	5	5
10	The broad education necessary to understand the impact of biotechnological solutions in global, economic, environmental and societal context.	4	4	4

Note: Cross-out whichever not applicable

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2) Promotion since graduation: yes/no (Yes)
3) Enrollment in higher studies: yes/no. if yes answer following
   i) Name of programme : PGDM, NMIMS ii) Year of completion 2020_____
4) Involvement in professional societies as a Manager_____
5) Community service, if any Environment Related Activities _____
6) Overall how satisfied are you with B.Tech biotechnology programme at TIET and in your opinion how well is the B.Tech biotechnology programme meeting its stated educational objectives : Excellent/Very good/Good/Average/Poor (Very Good)

Name with signature : Rhythm Aggarwal Your current organization : Persuing Higher Studies

Survey form to assess the various aspects of B. Tech program -Employer

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The employer is requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement. The results will help us to improve our programme. Thank you very much for your assistance.

Survey questionnaire		Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
1	Language proficiency a) Expressions of ideas b) Comprehension of written and verbal communication c) English proficiency				✓	
2	Numerical competency a) Comprehension of data b) Preparation of data c) Application of data				✓	
3	IT proficiency a) Use of job specific computer software b) Ability to learn new software c) Proficiency in using in internet or intranet			✓		
4	Analytical skills a) Creativity b) Problem solving ability				✓	
5	Work attitude a) Commitment and perseverance b) Initiative c) Teamwork d) Ability to work independently					✓
6	Management skills a) Organization of work b) Conflict resolution c) Leadership and management of staff					✓
7	Technical skills a) Adequate skills and knowledge b) Aware of occupational health and safety practices c) Ability to solve technical bottlenecks				✓	

Employer details:

(a) Employer's name : Roots Analysis

(b) Employer's address: A-430, Bestech Business Towers, Sector 66, Mohali (Chandigarh)

Survey form to assess the various aspects of B. Tech program -Employer

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The employer is requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement. The results will help us to improve our programme. Thank you very much for your assistance.

Survey questionnaire		Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
1	Language proficiency a) Expressions of ideas b) Comprehension of written and verbal communication c) English proficiency				✓	
2	Numerical competency a) Comprehension of data b) Preparation of data c) Application of data				✓	
3	IT proficiency a) Use of job specific computer software b) Ability to learn new software c) Proficiency in using in internet or intranet			✓		
4	Analytical skills a) Creativity b) Problem solving ability				✓	
5	Work attitude a) Commitment and perseverance b) Initiative c) Teamwork d) Ability to work independently					✓
6	Management skills a) Organization of work b) Conflict resolution c) Leadership and management of staff					✓
7	Technical skills a) Adequate skills and knowledge b) Aware of occupational health and safety practices c) Ability to solve technical bottlenecks				✓	

Employer details:

(a) Employer's name : Roots Analysis

(b) Employer's address: A-430, Bestech Business Towers, Sector 66, Mohali (Chandigarh)

Survey form to assess the level of attainment of program outcomes – Graduating Students

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The students of graduating class are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
	I will be able to	1	2	3	4	5
1	Apply the knowledge of mathematics, science, engineering fundamentals and biotechnology for the solution of underlying problems of life sciences.				✓	
2	Identify, formulate, review research literature and analyze complex biotech problems by reaching practical conclusions using the principles of natural sciences and engineering sciences.					✓
3	Understanding the public health and safety concepts and the cultural, societal and environmental considerations while applying in the field of biotechnology.					✓
4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions in laboratory and industry.				✓	
5	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.				✓	
6	Communicate effectively with biotechnology community and with society at large on complex biotechnological related activities such as being able to comprehend, write effective reports and design documentation, make effective presentations and give and receive clear instructions.				✓	
7	Demonstrate knowledge and understanding of the biotech and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.					✓
8	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the field of developments in biotechnology.					✓
9	Understand the impact of biotechnological solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.				✓	
10	Apply ethical principles and commit to professional ethics and responsibilities in norms of the biotechnological practices.					✓

What do you plan to do after graduation at TIET? Tick (√) whichever is applicable

(a) Employment (give details): _____

(b) Higher education (give the title of degree): Pursuing PhD

(c) Entrepreneur (specify): _____

Student's name: Hardeen Kaur Walia Regd. No: 70110016

Suggestion, if any: The learning throughout has been really good. Really nice faculty.

Survey form to assess the level of attainment of program outcomes – Graduating Students

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The students of graduating class are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
	I will be able to	1	2	3	4	5
1	Apply the knowledge of mathematics, science, engineering fundamentals and biotechnology for the solution of underlying problems of life sciences.					✓
2	Identify, formulate, review research literature and analyze complex biotech problems by reaching practical conclusions using the principles of natural sciences and engineering sciences.				✓	
3	Understanding the public health and safety concepts and the cultural, societal and environmental considerations while applying in the field of biotechnology.					✓
4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions in laboratory and industry.					✓
5	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.				✓	
6	Communicate effectively with biotechnology community and with society at large on complex biotechnological related activities such as being able to comprehend, write effective reports and design documentation, make effective presentations and give and receive clear instructions.					✓
7	Demonstrate knowledge and understanding of the biotech and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.				✓	
8	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the field of developments in biotechnology.					✓
9	Understand the impact of biotechnological solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.					✓
10	Apply ethical principles and commit to professional ethics and responsibilities in norms of the biotechnological practices.					✓

What do you plan to do after graduation at TIET? Tick (√) whichever is applicable

(a) Employment (give details): _____

(b) Higher education (give the title of degree): PhD (Pursuing from TIET, 2016 onwards)

(c) Entrepreneur (specify): _____

Student's name: Davinder Singh Regd. No: 701100010

Suggestion, if any: _____

Survey form to assess the level of attainment of program outcomes – Graduating Students

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The students of graduating class are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
	I will be able to	1	2	3	4	5
1	Apply the knowledge of mathematics, science, engineering fundamentals and biotechnology for the solution of underlying problems of life sciences.				✓	
2	Identify, formulate, review research literature and analyze complex biotech problems by reaching practical conclusions using the principles of natural sciences and engineering sciences.			✓		
3	Understanding the public health and safety concepts and the cultural, societal and environmental considerations while applying in the field of biotechnology.				✓	
4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions in laboratory and industry.			✓		
5	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.				✓	
6	Communicate effectively with biotechnology community and with society at large on complex biotechnological related activities such as being able to comprehend, write effective reports and design documentation, make effective presentations and give and receive clear instructions.			✓		
7	Demonstrate knowledge and understanding of the biotech and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.				✓	
8	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the field of developments in biotechnology.				✓	
9	Understand the impact of biotechnological solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.				✓	
10	Apply ethical principles and commit to professional ethics and responsibilities in norms of the biotechnological practices.			✓		

What do you plan to do after graduation at TIET? Tick (√) whichever is applicable

(a) Employment (give details): _____

(b) Higher education (give the title of degree): P.h.D pursuing

(c) Entrepreneur (specify): _____

Student's name: Jayishree Singla Regd. No: 901514005

Suggestion, if any: N.A

Survey form to assess the level of attainment of program outcomes – Graduating Students

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The students of graduating class are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
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1	Apply the knowledge of mathematics, science, engineering fundamentals and biotechnology for the solution of underlying problems of life sciences.				✓	
2	Identify, formulate, review research literature and analyze complex biotech problems by reaching practical conclusions using the principles of natural sciences and engineering sciences.			✓		
3	Understanding the public health and safety concepts and the cultural, societal and environmental considerations while applying in the field of biotechnology.			✓		
4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions in laboratory and industry.				✓	
5	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.				✓	
6	Communicate effectively with biotechnology community and with society at large on complex biotechnological related activities such as being able to comprehend, write effective reports and design documentation, make effective presentations and give and receive clear instructions.			✓		
7	Demonstrate knowledge and understanding of the biotech and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.				✓	
8	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the field of developments in biotechnology.				✓	
9	Understand the impact of biotechnological solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.				✓	
10	Apply ethical principles and commit to professional ethics and responsibilities in norms of the biotechnological practices.				✓	

What do you plan to do after graduation at TIET? Tick (√) whichever is applicable

(a) Employment (give details): ✓ (Market Research Consultant)

(b) Higher education (give the title of degree): NA

(c) Entrepreneur (specify): NA

Student's name: Arun Gupta Regd. No: 701100007

Suggestion, if any: Syllabus may to need to be realigned with changing industry dynamics and employment opportunities

Survey form to assess the level of attainment of program outcomes – Graduating Students

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The students of graduating class are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
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3	Understanding the public health and safety concepts and the cultural, societal and environmental considerations while applying in the field of biotechnology.					✓
4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions in laboratory and industry.				✓	
5	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.				✓	
6	Communicate effectively with biotechnology community and with society at large on complex biotechnological related activities such as being able to comprehend, write effective reports and design documentation, make effective presentations and give and receive clear instructions.				✓	
7	Demonstrate knowledge and understanding of the biotech and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.					✓
8	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the field of developments in biotechnology.					✓
9	Understand the impact of biotechnological solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.				✓	
10	Apply ethical principles and commit to professional ethics and responsibilities in norms of the biotechnological practices.					✓

What do you plan to do after graduation at TIET? Tick (√) whichever is applicable

(a) Employment (give details): _____

(b) Higher education (give the title of degree): Pursuing PhD

(c) Entrepreneur (specify): _____

Survey form to assess the level of attainment of program outcomes – Graduating Students

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The students of graduating class are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement.

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2	Identify, formulate, review research literature and analyze complex biotech problems by reaching practical conclusions using the principles of natural sciences and engineering sciences.				✓	
3	Understanding the public health and safety concepts and the cultural, societal and environmental considerations while applying in the field of biotechnology.					✓
4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions in laboratory and industry.					✓
5	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.				✓	
6	Communicate effectively with biotechnology community and with society at large on complex biotechnological related activities such as being able to comprehend, write effective reports and design documentation, make effective presentations and give and receive clear instructions.					✓
7	Demonstrate knowledge and understanding of the biotech and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.				✓	
8	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the field of developments in biotechnology.					✓
9	Understand the impact of biotechnological solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.					✓
10	Apply ethical principles and commit to professional ethics and responsibilities in norms of the biotechnological practices.					✓

What do you plan to do after graduation at TIET? Tick (√) whichever is applicable

(a) Employment (give details): _____

(b) Higher education (give the title of degree): PhD (Pursuing from TIET, 2011 onwards)

(c) Entrepreneur (specify): _____

Survey form to assess the level of attainment of program outcomes – Graduating Students

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The students of graduating class are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement.

Survey questionnaire		Level of attainment (answer on a scale of 1 to 5)				
	I will be able to	1	2	3	4	5
1	Apply the knowledge of mathematics, science, engineering fundamentals and biotechnology for the solution of underlying problems of life sciences.				✓	
2	Identify, formulate, review research literature and analyze complex biotech problems by reaching practical conclusions using the principles of natural sciences and engineering sciences.			✓		
3	Understanding the public health and safety concepts and the cultural, societal and environmental considerations while applying in the field of biotechnology.				✓	
4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions in laboratory and industry.			✓		
5	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.				✓	
6	Communicate effectively with biotechnology community and with society at large on complex biotechnological related activities such as being able to comprehend, write effective reports and design documentation, make effective presentations and give and receive clear instructions.			✓		
7	Demonstrate knowledge and understanding of the biotech and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.				✓	
8	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the field of developments in biotechnology.				✓	
9	Understand the impact of biotechnological solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.				✓	
10	Apply ethical principles and commit to professional ethics and responsibilities in norms of the biotechnological practices.			✓		

What do you plan to do after graduation at TIET? Tick (√) whichever is applicable

(a) Employment (give details): _____

(b) Higher education (give the title of degree): P.h.D pursuing

(c) Entrepreneur (specify): _____

Survey form to assess the level of attainment of program outcomes – Graduating Students

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The students of graduating class are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement.

Survey questionnaire		Level of attainment (answer on a scale of 1 to 5)				
	I will be able to	1	2	3	4	5
1	Apply the knowledge of mathematics, science, engineering fundamentals and biotechnology for the solution of underlying problems of life sciences.				✓	
2	Identify, formulate, review research literature and analyze complex biotech problems by reaching practical conclusions using the principles of natural sciences and engineering sciences.			✓		
3	Understanding the public health and safety concepts and the cultural, societal and environmental considerations while applying in the field of biotechnology.			✓		
4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions in laboratory and industry.				✓	
5	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.				✓	
6	Communicate effectively with biotechnology community and with society at large on complex biotechnological related activities such as being able to comprehend, write effective reports and design documentation, make effective presentations and give and receive clear instructions.			✓		
7	Demonstrate knowledge and understanding of the biotech and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.				✓	
8	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the field of developments in biotechnology.				✓	
9	Understand the impact of biotechnological solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.				✓	
10	Apply ethical principles and commit to professional ethics and responsibilities in norms of the biotechnological practices.				✓	

What do you plan to do after graduation at TIET? Tick (√) whichever is applicable

(a) Employment (give details): ✓ (Market Research Consultant)

(b) Higher education (give the title of degree): NA

(c) Entrepreneur (specify): NA

Student's name: Arun Gupta Regd. No: 701100007

Suggestion, if any: Syllabus may to need to be realigned with changing industry dynamics and employment opportunities

Survey form to assess the various aspects of B.Tech. program –Parents

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The parents are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement. The results will help us to serve both parents and students better. Thank you very much for your assistance.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
1	Overall, how satisfied are you with your son/daughter's graduate education so far?				✓	
2	Quality of academic experience a) Quality of instructions b) Quality of course contents c) Emphasis on undergraduate education d) Tutoring and other academic help e) Laboratory facilities and infrastructure				✓	
3	Graduate research opportunities.			✓		
4	Contact with faculty.			✓		
5	Career counselling and placement.			✓		
6	Quality of campus services and facilities.				✓	
7	Social life on campus.				✓	
8	Are you familiar with policies regarding scholarships?			✓		
9	Are you familiar with information regarding grades and attendance?				✓	
10	How would you evaluate your son/daughter's entire educational experience at this institution?				✓	

i) Parents name: Neeraj Gupta

ii) Student's name: Arun Gupta Regd no. 701100007

iii) Address: #34, Gupta Niwas, Chaudhary Colony, Bassi Pathana (Punjab) - 140412

iv) Contact: +91-9915206906

Survey form to assess the various aspects of B.Tech. program –Parents

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The parents are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement. The results will help us to serve both parents and students better. Thank you very much for your assistance.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
1	Overall, how satisfied are you with your son/daughter's graduate education so far?				✓	
2	Quality of academic experience a) Quality of instructions b) Quality of course contents c) Emphasis on undergraduate education d) Tutoring and other academic help e) Laboratory facilities and infrastructure				✓	
3	Graduate research opportunities.			✓		
4	Contact with faculty.			✓		
5	Career counselling and placement.			✓		
6	Quality of campus services and facilities.				✓	
7	Social life on campus.				✓	
8	Are you familiar with policies regarding scholarships?			✓		
9	Are you familiar with information regarding grades and attendance?				✓	
10	How would you evaluate your son/daughter's entire educational experience at this institution?				✓	

i) Parents name: Neeraj Gupta

ii) Student's name: Arun Gupta Regd no. 701100007

iii) Address: #34, Gupta Niwas, Chaudhary Colony, Bassi Pathana (Punjab) - 140412

iv) Contact: +91-9915206906

Survey form to assess the various aspects of B.Tech. program –Parents

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The parents are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement. The results will help us to serve both parents and students better. Thank you very much for your assistance.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
1	Overall, how satisfied are you with your son/daughter's graduate education so far?				✓	
2	Quality of academic experience a) Quality of instructions b) Quality of course contents c) Emphasis on undergraduate education d) Tutoring and other academic help e) Laboratory facilities and infrastructure				✓ ✓	✓ ✓ ✓
3	Graduate research opportunities.				✓	
4	Contact with faculty.					✓
5	Career counselling and placement.				✓	
6	Quality of campus services and facilities.					✓
7	Social life on campus.				✓	
8	Are you familiar with policies regarding scholarships?				✓	
9	Are you familiar with information regarding grades and attendance?					✓
10	How would you evaluate your son/daughter's entire educational experience at this institution?					✓

i) Parents name: Dr. Kulwant Singh Walia

ii) Student's name Harleen Kaur Walia Regd no. 701100016

iii) Address: 21, Preet Nagar, Tripuri Road, Patiala

iv) Contact: 9988980079

Survey form to assess the various aspects of B.Tech. program –Parents

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The parents are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement. The results will help us to serve both parents and students better. Thank you very much for your assistance.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
1	Overall, how satisfied are you with your son/daughter's graduate education so far?					✓
2	Quality of academic experience a) Quality of instructions b) Quality of course contents c) Emphasis on undergraduate education d) Tutoring and other academic help e) Laboratory facilities and infrastructure				✓	
3	Graduate research opportunities.				✓	
4	Contact with faculty.					✓
5	Career counselling and placement.				✓	
6	Quality of campus services and facilities.					✓
7	Social life on campus.				✓	
8	Are you familiar with policies regarding scholarships?					✓
9	Are you familiar with information regarding grades and attendance?					✓
10	How would you evaluate your son/daughter's entire educational experience at this institution?				✓	

i) Parents name: GURMEET SINGH

ii) Student's name DAVINDER SINGH Regd no. 701100010

iii) Address: VILLAGE: MOUR ; DISTRICT & TEHSIL: SRI MUKTSAR SAHIB, PUNJAB - 152026

iv) Contact: +91- 94635- 19353

Survey form to assess the various aspects of B.Tech. program –Parents

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The parents are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement. The results will help us to serve both parents and students better. Thank you very much for your assistance.

	Survey questionnaire	Level of attainment (answer on a scale of 1 to 5)				
		1	2	3	4	5
1	Overall, how satisfied are you with your son/daughter's graduate education so far?				✓	
2	Quality of academic experience a) Quality of instructions b) Quality of course contents c) Emphasis on undergraduate education d) Tutoring and other academic help e) Laboratory facilities and infrastructure				✓ ✓	✓ ✓ ✓
3	Graduate research opportunities.				✓	
4	Contact with faculty.					✓
5	Career counselling and placement.				✓	
6	Quality of campus services and facilities.					✓
7	Social life on campus.				✓	
8	Are you familiar with policies regarding scholarships?				✓	
9	Are you familiar with information regarding grades and attendance?					✓
10	How would you evaluate your son/daughter's entire educational experience at this institution?					✓

i) Parents name: Dr. Kulwant Singh Walia

ii) Student's name Harleen Kaur Walia Regd no 701100016

iii) Address: 21, Preet Nagar, Tripuri Road, Patiala

iv) Contact: 9988980079

Survey form to assess the various aspects of B.Tech. program –Parents

The program of B.Tech Biotechnology has been designed with certain program outcomes, the knowledge skills and attributes that students develop during the course of study. The parents are requested to answer the questionnaire given in this form to assess the student outcomes on a scale of 1 to 5 where 1 indicates little achievement or skill and 5 indicates great level of achievement. The results will help us to serve both parents and students better. Thank you very much for your assistance.

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		1	2	3	4	5
1	Overall, how satisfied are you with your son/daughter's graduate education so far?					✓
2	Quality of academic experience a) Quality of instructions b) Quality of course contents c) Emphasis on undergraduate education d) Tutoring and other academic help e) Laboratory facilities and infrastructure				✓	
3	Graduate research opportunities.				✓	
4	Contact with faculty.					✓
5	Career counselling and placement.				✓	
6	Quality of campus services and facilities.					✓
7	Social life on campus.				✓	
8	Are you familiar with policies regarding scholarships?					✓
9	Are you familiar with information regarding grades and attendance?					✓
10	How would you evaluate your son/daughter's entire educational experience at this institution?				✓	

i) Parents name: GURMEET SINGH

ii) Student's name DAVINDER SINGH Regd no. 701100010

iii) Address: VILLAGE: MOUR ; DISTRICT & TEHSIL: SRI MUKTSAR SAHIB, PUNJAB - 152026

iv) Contact: +91- 94635- 19353

Process of Program outcome attainment:

The Program Outcomes (PO) or the Program Specific Outcomes (PSO) are achieved through curriculum that offers a number of mandatory courses as well as elective courses. Each course in the curriculum has defined course outcomes that are mapped to the program outcomes and a set of performance criteria that are used to provide quantitative measurement of how well course outcomes are achieved. The process of PO or PSO attainment level is shown by the following flowchart:

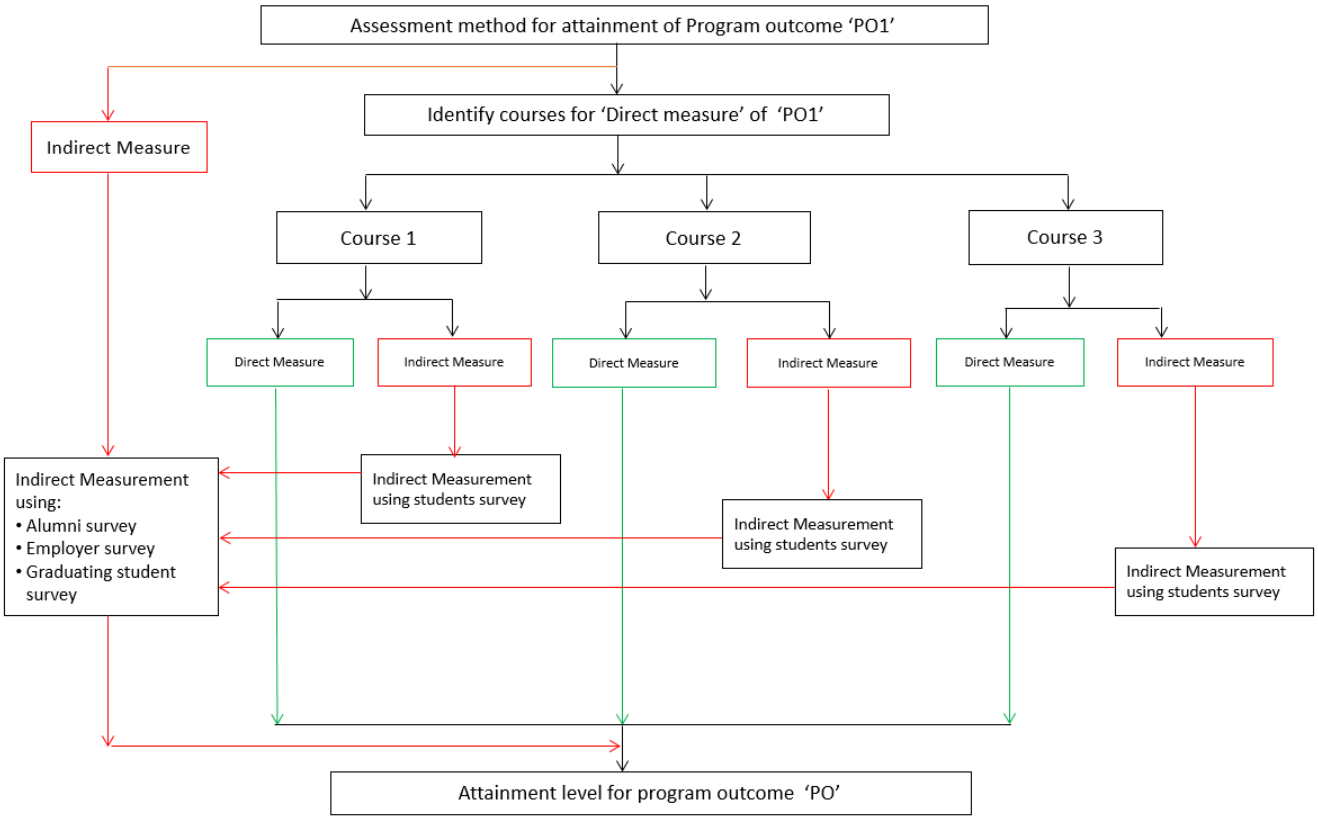


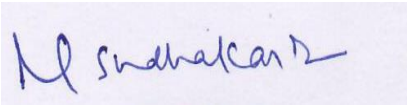
Figure 1 : Flowchart showing the process of PO/PSO attainment level

As shown in the flowchart given above, each of the PO or the PSO are assessed using a direct and an indirect method.

This assessment is carried out using the following measurable and quantitative parameters and survey/questionnaire techniques/tools.

A. <u>Assessment Tools used for measurement of Program Outcome attainment:</u>

In the Outcome Based Education (OBE), the course outcome attainment scores measured using direct and indirect assessment tools is eventually used for measuring the attainment of Program Outcomes and Program specific outcomes. Thus, PO and PSO assessment process



uses both direct and indirect measures to measure the attainment of each outcome. The examples of such measures are given below:

1. Direct Assessment tools:

After evaluating the attainment of course outcomes using direct assessment tools, average direct CO score for each course is computed. Direct assessment score for attainment of PO and PSO is computed by mapping the direct CO scores for all courses with corresponding PO's as defined in the Program articulation matrix. Following direct assessment tools are employed for measuring PO /PSO attainment:

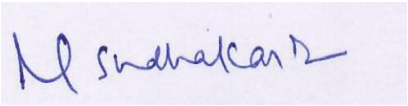
- Mid Semester Examinations [Once during 8th or 9th week of a semester]
- End semester Examination [once during 15th week of the semester]
- Tutorial Assignments [Varies depending on the tutorial engagement]
- Quizzes [Mostly once during semester, Varies and is decided by course coordinator]
- Projects [Mostly once during semester, Varies and is decided by course coordinator]

2. Indirect Assessment tools:

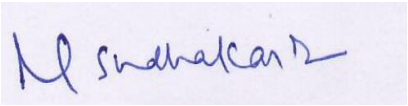
This includes feedbacks from all the stakeholders such as course exit survey, Graduating student survey, alumni feedback, Employer feedback etc.

Table: **Indirect Assessment Tools**

S. No.	Indirect Assessment Tool	Method Description
1	Course Survey [Twice before MST and EST]	Course Survey is completed for every course in each semester to get a formal feedback from students for the courses offered in a semester and provide objective information to the faculty for self-appraisal, self-improvement & development. The course survey is focussed on attainment of course outcomes. Formal student feedback is obtained online and it is mandatory for all students to participate in such surveys. The course survey results are compiled by the individual course instructors for his feedback.
2	Graduating student's	A questionnaire survey is used to measure the level of achievement of expected program outcomes/program specific outcomes. It is



	survey [Once per year for the graduating batch]	mandatory for all graduating students to participate in this questionnaire. Each participant is asked to rate his/her perception of achievement of the program outcomes/program specific outcome on a scale of 1 to 3 or 1 to 5 where 1 signifies a poor outcome and 3/5 signifies a high level of achievement of objectives. The indirect CO scores measured through this tool are mapped to Likert scale of 1 to 3 or 1 to 5. The assessment results are documented and discussed in the meeting of department faculty to make action points for initiating corrective and preventive actions. A sample copy of graduating students' survey form is provided in Annexure-I
3	Alumni survey [Once in three years]	It is believed that the perception of students changes from the time of graduation to some point in their respective careers as they get more mature and have learnt tricks of the trade on the job. At this point of time, they are in a better position to provide more valuable and objective feedback on the learning in their undergraduate program and also how much of the program outcomes (on some scale) have actually been possible. To obtain this information, a survey is conducted for practicing alumni who graduated during the last 2 to 5 years. This survey like the graduating student survey is targeted at the program outcomes & program specific outcomes achieved during the last 2 to 5 years. Again, the respondents are asked to rate each PO and PSO on a scale of 1 to 3 or 1 to 5. The indirect CO scores measured through this tool are mapped to Likert scale of 1 to 3 or 1 to 5. The findings of the survey are processed and used for effecting improvements in the program to achieve the program educational objectives and program outcomes.
4	Employer survey [Once in three years]	All the students of program to be accredited are required to spend a full six month's semester in the industry completing an industrial project under the joint supervision of industry supervisors and TIET faculty. All the faculty members are required to visit one or two organizations two times during their six month's semester in the industry for evaluation of students placed for their work term in these organizations.



		This provides an opportunity to take feedback of our graduated students working in these organizations. During the course of interaction with the employer of our students, the employers provide information on their performance against POs & PSOs through survey form. This form, like the other forms, has questions related to the POs & PSOs. The rating is again given on a scale of 1 to 3 or 1 to 5 with 3/5 representing the best performance. The indirect CO scores measured through this tool are mapped to Likert scale of 1 to 3 or 1 to 5. A sample copy of employer survey form is provided in Annexure-I

B. <u>Processes used for measurement of Program Outcome attainment:</u>

CO Attainment scores for each subject obtained by direct assessment tools is mapped to correlated PO or PSO using the course articulation matrix. Similarly, CO attainment scores achieved through indirect assessment tools are also mapped with the correlated PO or PSO.

PO/PSO Attainment (Direct Assessment) $= \left[\frac{\text{PO \_CO Mapping}}{3} \times CO\ Attainment\ (Direct\ Assessment\right]$

PO/PSO Attainment (Indirect Assessment) $= \left[\frac{\text{PO \_CO Mapping}}{3} \times CO\ Attainment\ (Indirect\ Assessment\right]$

Attainment for a program outcome is finally computed by taking weighted average of contributions of participating courses towards that particular PO or PSO.

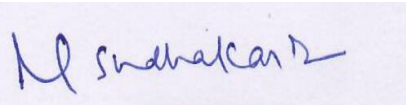
Finally, program outcomes for entire course is assessed by taking weighted sum of direct and indirect assessment as

Overall PO/PSO = 80% weightage of direct PO Score + 20% weightage of Indirect PO Score

Table 1 below shows the frequency of data collection of each form.

Table 1: Assessment tools, frequency of data collection and weightage

Assessment Tool	When data is collected	Frequency of Data Analysis	Weightage



Course Portfolio	During the semester	Once in a year	**5**
Course Survey	End of the semester	Once in a year	**4**
Graduating Student's Survey	End of the program	Once in a year	**3**
Alumni Survey	After 2-5 year of graduation	Once in 3 years	
Employer Survey		Once in 3 years	

On the basis of results of assessment tools, the assessment of level of attainment of each PO or PSO outcome is carried out. The assessment loop for each program outcomes is shown in Figure 2.

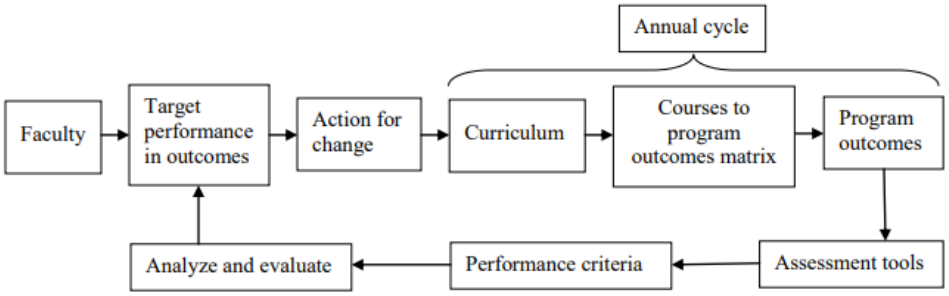
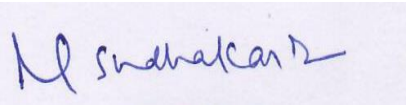


Figure 2: Assessment loop for PO/PSO

Continuous assessment for the academic year 2019-20 to 2021-22

Attainment levels for all the courses taught and against all the PO and POSs, the target attainment was achieved. The courses used for representation of all the POs and PSOs are UCH301, UBT302, UBT504, UBT303, UBT304, UPH305, UBT501, UBT503, UBT404, UCH407, UEN002, UBT801, UBT601, UBT602, UBT603, UBT605, UBT508, UTA012, UHU005, UBT606, UBT607, UBT608, UBT609, UBT604, UBT621, UBT622, UBT623, UBT793, UBT794, UBT702, UBT704, UBT795, UBT802, UBT822, UBT832, UBT891, UBT834, UBT835, UBT836, UBT823, UBT841, UBT842.



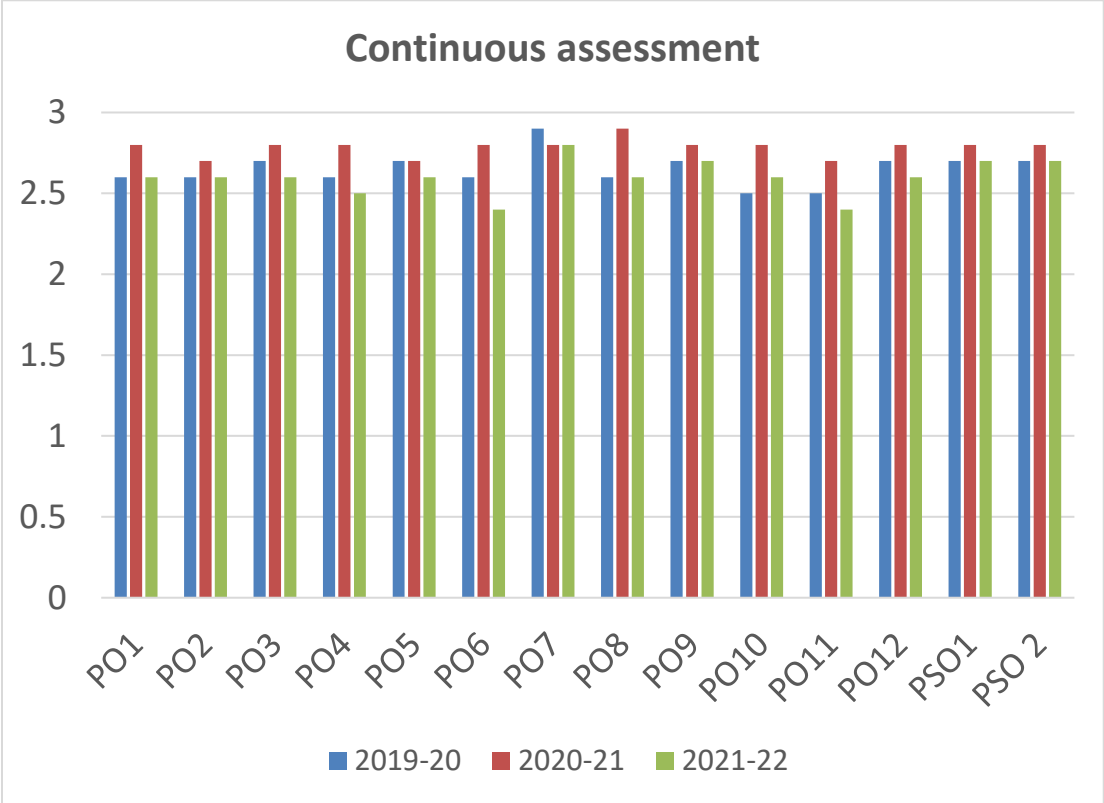
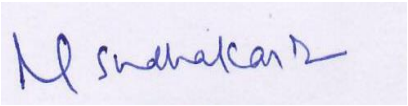


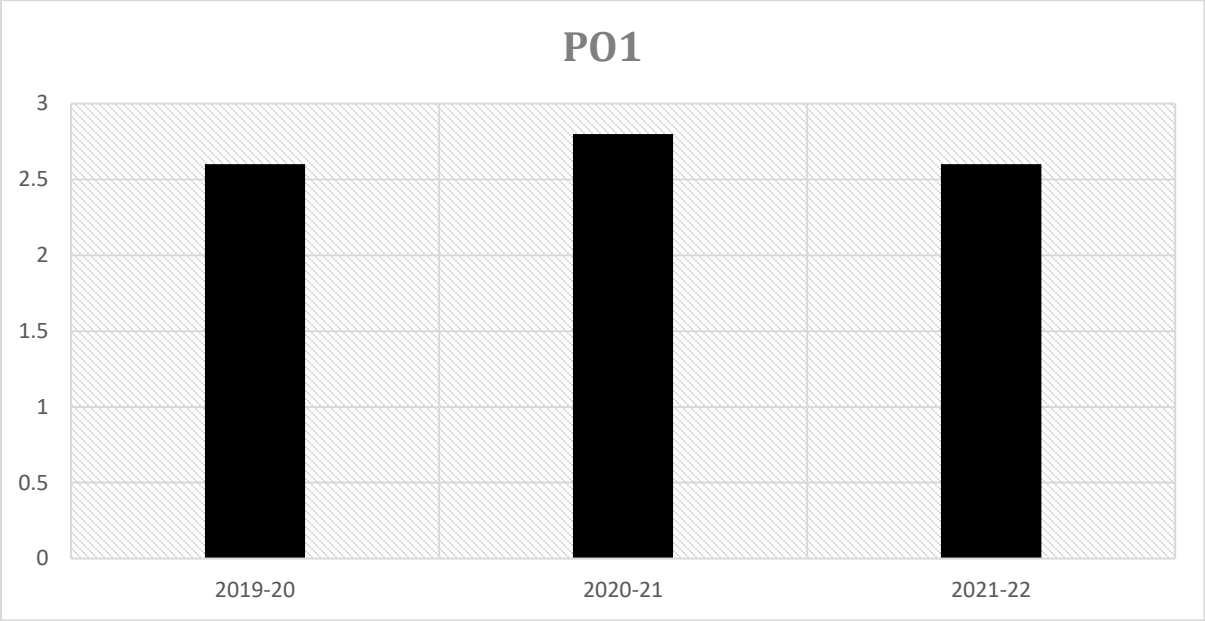
Figure 3: Continuous assessment of the PO1 to PO12 and PSO1, PSO2

Actions taken based on the results of evaluation of each of the COs, POs & PSOs

Based on the CO, PO, and PSO attainment levels, subjects were identified whose CO attainment level was low but weightage towards calculation of a PO/PSO level was high. For such subjects, the concerned faculty prepared an Action Taken Report (ATR), providing details of reasons for the low attainment level and the actions to improve upon the same.

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.





Action Taken Report:

Subject Name: Bioanalytical Techniques

Subject Code: UBT501

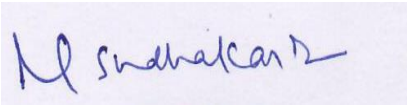
Name of Teacher submitting the ATR: Dr. Anil Kumar

Reasons for overall low attainment of CO

1. The regular classes were held till the mid-semester test (MST). Thereafter the unprecedented lockdown was imposed in mid of March due to COVID. In spite of the best efforts, the transition from offline to online was not received well for such practical intensive course with lot of understanding of the basic analytical skills.
2. It is difficult to provide the real-time experience of high end instruments in an online mode to the students. Many aspects of techniques, students were not able to understand under such condition.
3. During online teaching it is difficult to track the real attendance of the students

Actions taken for improvement

1. I hope in subsequent times the course will run in an offline mode, which will provide students with better understanding as during earlier years.
2. One-to-one interaction in an offline mode will help both students and teacher in achieving CLOs.
3. Students will have better understanding about the working of various sophisticated analytical



equipment.

Specific CO wise action taken report (ATR)

CO1 MST Q2

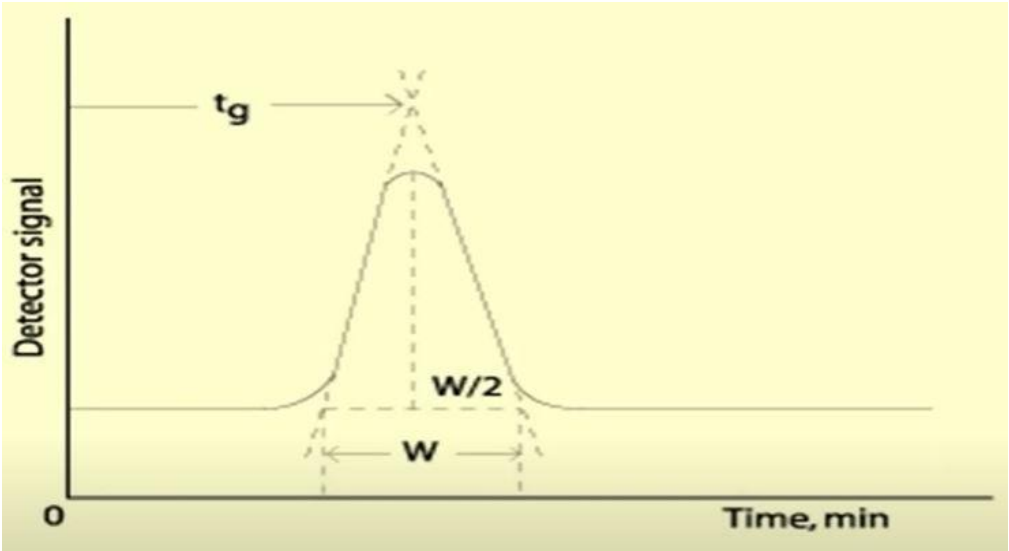
(A). Define theoretical plate number and how can you calculate the theoretical plate number from chromatogram.

(B). Describe the factors affecting peak broadening.

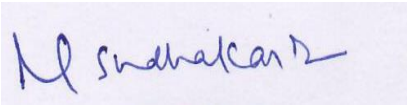
Action Taken: This is a theoretical type of question, which is based on the fundamental concepts. Probably due to this, there could be lack of understanding on the part of students.

During subsequent years, affords will be made to explain with the help of online video resources such as given below:

https://www.youtube.com/watch?v=k-caQ5lT5ho



CO2 EST Q3: Describe principle and instrumentation of Nuclear magnetic resonance (NMR).



Action Taken: This is a bit difficult topic and was taken up after MST in an online mode. There could be an issue of understanding as this requires more one-to-one interaction. In subsequent time when the course will be taken up in offline mode, there will be a better understanding as it was during earlier years. However, further help of the various online resources will be taken

- Animated brief introduction to NMR
- Basics of NMR Spectroscopy, online interactive textbook by Joseph P. Hornak, PhD

CO3. EST Q1 Describe the principle, construction and working of epifluorescence microscope.

Action taken: The topic was again taken up after MST in an online mode. Students could not be exposed to the real-time working of the equipment. I feel exposing students to the working of the equipment will attract their interest and the performance will be better.

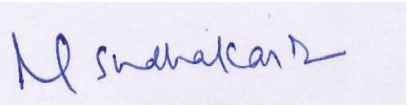
CO4. MST Q1. (A) Based on stationary phase, name different types of chromatography.

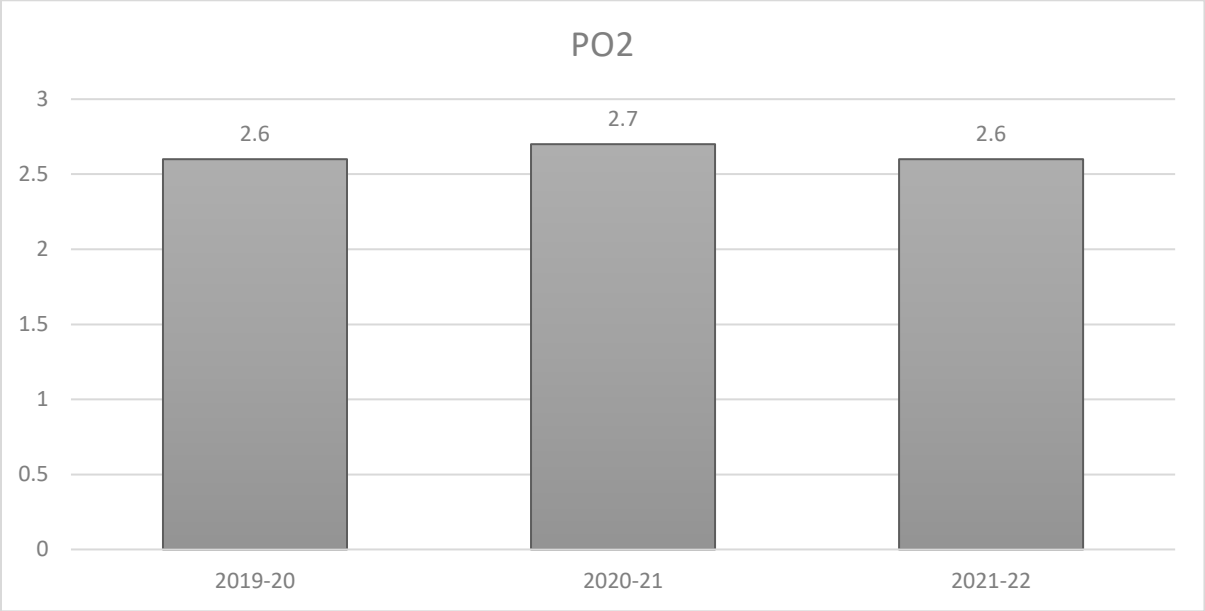
(B). Describe various components of HPLC

This is also a concept based question and require a thorough knowledge of the construction of High Performance Liquid Chromatography (HPLC) system.

In order to address this problem of the student more exposure will be given to the students in the practical class. The students will be made aware about the role of different parts of various analytical equipment in the subsequent years. So that the understanding of the students improve.

PO2: Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.





Action Taken Report:

Subject Name: Biochemistry-II

Subject Code: UBT303

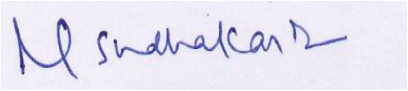
Name of Teacher submitting the ATR: Dr. Sanjai Saxena

Reasons for overall low attainment of CO

The course of Biochemistry-II was delivered in an online mode due to lockdown because of COVID-19 pandemic. Biochemistry-II is a interactive as well as dynamic subject requiring a lot of one to one interaction to explain the process of metabolism and communication happening with the living system. Thus they are intricate concepts which need to be explained and understood by the students. In online mode of discussion, the participation of the student in virtual mode in terms of focus, attentiveness and concept clarity was very difficult to ascertain, Moreover, it was the first experience of student also in taking up lectures in virtual mode.

Actions taken for improvement

1. With reverting back to offline mode of teaching and one to one interaction within the class, it is expected the concept clarity and his inquisitiveness or doubts would be well solved. Further during the one-to-one interaction, as faculty I can gauge which is the problematic domain which needs a repetition or concept clarity.



2. One-to-one interaction in an offline mode will help both students and teacher in achieving CLOs as students will have better concept clarity.

SPECIFIC CO WISE ACTION TAKEN REPORT (ATR)

CO3 Sessional Quiz 3 (A). 20 Multiple choice questions and 02 correct matching questions were asked in this quiz pertaining to Intermediary metabolism with focus on fatty acid metabolism.

Action Taken: The attempt was poor in this sessional test due to the fatty acid metabolism being a bit complex due to diversity of different types of lipid molecules and their pathways in energy generation as well as energy storage.

For example, confusion persists in types of oxidation processes such as the β-oxidation and ω-oxidation. In β-oxidation the oxidative process to generate acetyl CoA beings from beta-carbon atom from the carboxyl group while in ω-oxidation the process beings from the most distant carbon atom from the carboxyl group. Further in ω-oxidation, three step changes happen and then it follows the β-oxidation process.

In offline class mode, these complexes can be explained in a better way than online mode, thereby clearing their doubts and queries which will lead to a better performance as compared to the previous in online mode.

Further to this online video links were provided to the students to attain better clarity as well as some books which explain the concepts in a lucid manner would also be recommended.

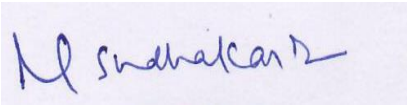
For Example:

Fatty acid oxidation (beta oxidations, Biochemistry animations): https://youtu.be/slCmrtFHFQQ

Biochemistry, Mary K. Campbell; Shawn O. Farrell and O.M. McDougal, CENGAGE Learning (2016), ISBN-13: 978-1305961135 (Fatty acid metabolism to be specifically referred)

CO4 EST Q.2 (a) Explain the difference between Endocrine and Paracrine Signalling by giving suitable examples.

(b) Draw a neat well-labelled diagram of heterotrimeric GPCR and explain the process of signal transduction by citing a suitable example.



Action taken: There was poor performance in this question 2 (a) probably due to carrying out a comparative analysis between two signalling mechanism despite being taught in detail about both the mechanisms, in future these would be explained in the class as points as well as would be given with numerous examples.

In question 2(b) probably the students did not remember the structural aspects of a receptor protein, the emphasis of remembering important structures would now be laid in their sessional as quizzes / tutorials. Further to remember the process/ mechanism of signal transduction, they shall be shown as well as provided the links of videos explaining the processes.

SIGNAL TRANSDUCTION ANIMATION: https://youtu.be/FtVb7r8aHco

SIGNAL TRANSDUCTION PATHWAYS: https://youtu.be/qOVkedxDqQo (bozemanscience.com)

CO6 EST Q.1

(a) Explain why does glucose molecule gets phosphorylated within the cell?

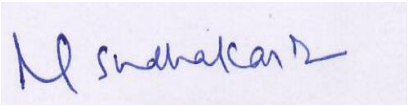
(b) What is substrate-level phosphorylation? Give a suitable example.

(c) Where does the conversion of pyruvate to Acetyl CoA happen? Which enzyme or enzyme complex participates in this conversion? Mention the different components of the enzyme/enzyme complex involved in the conversion of pyruvate to Acetyl CoA.

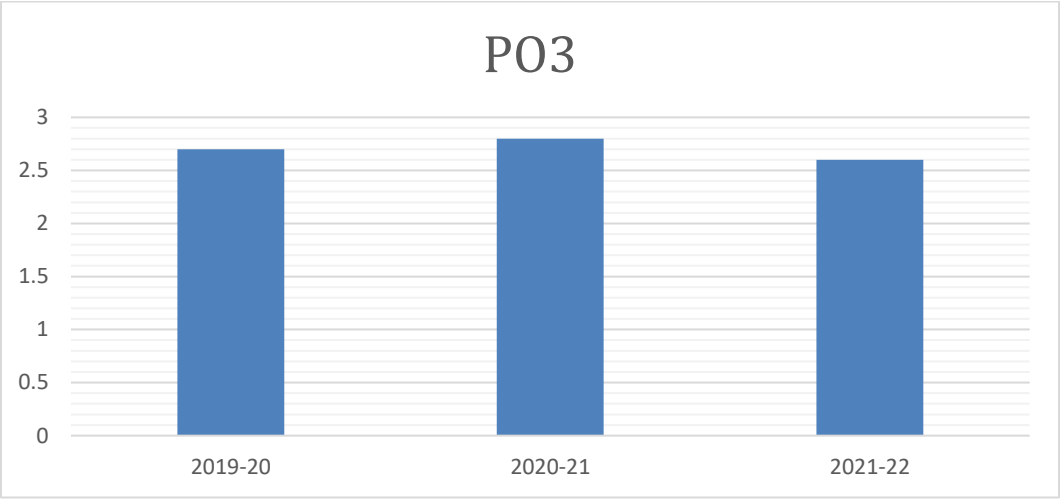
(d) Which step is considered the committed step of glycolysis?

Action taken: As all the questions pertained to intermediary metabolism and concept clarity would have marred their performance as being first timers to understand the different metabolic pathways in a greater detail. In future even in the offline mode, quizzes based on topics would be taken so that they continuously revise the concept and seek clarifications in the case of doubt to improve their performance.

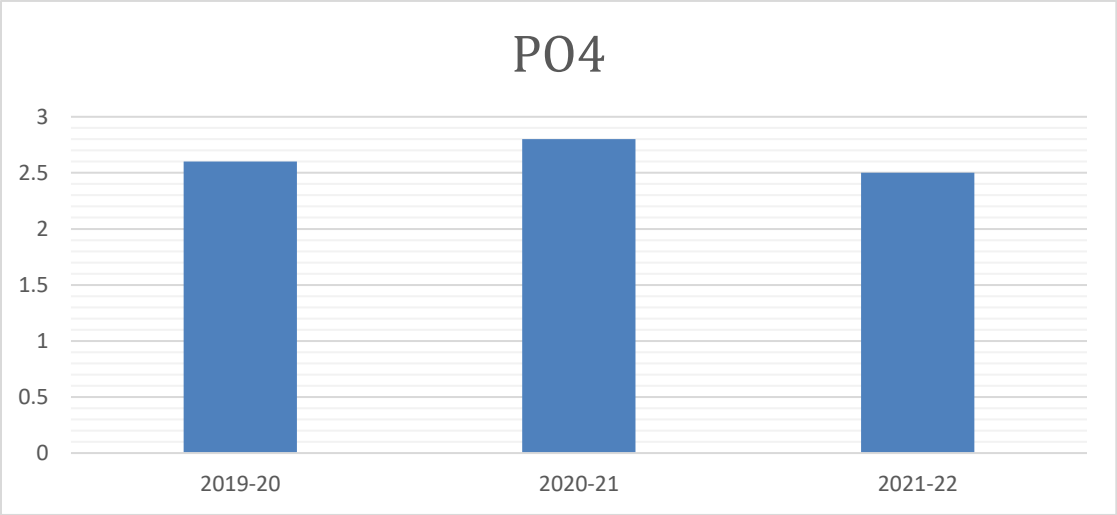
Further the book- **Biochemistry**, Mary K. Campbell; Shawn O. Farrell and O.M. McDougal, CENGAGE Learning (2016), ISBN-13: 978-1305961135 would be recommended to cover up the intermediary metabolism as it explains the concept in a simple way.

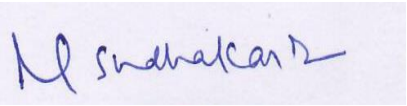


PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

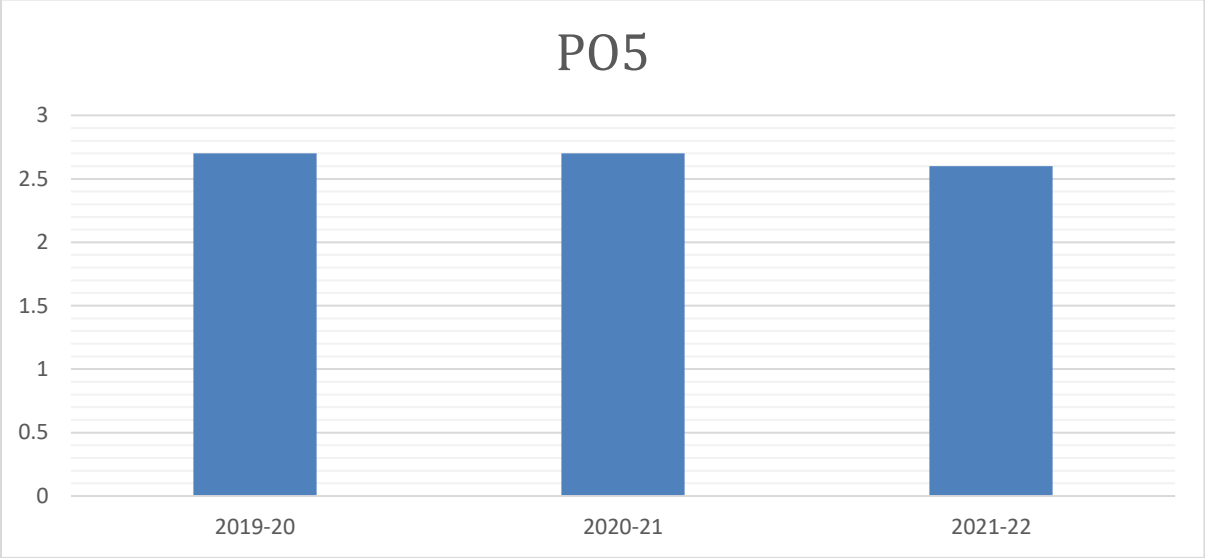


PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.





PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.



Subject Name: Molecular Biology

Subject Code: UBT304

Name of Teacher submitting the ATR: Vikas Handa

Reasons for low attainment of CO

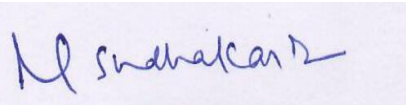
The above-mentioned course was taught during the time of the pandemic (July - Dec. 2021). The students were not present on campus for some time and the course was run online in that duration. Due to internet connectivity issue, students could not attend all the lectures regularly.

Action Plan

1. The students will be conveyed the importance of interaction and discussion of topics with their teacher in case of any need.
2. Class demonstration and animations will be employed in addition to classroom teaching.

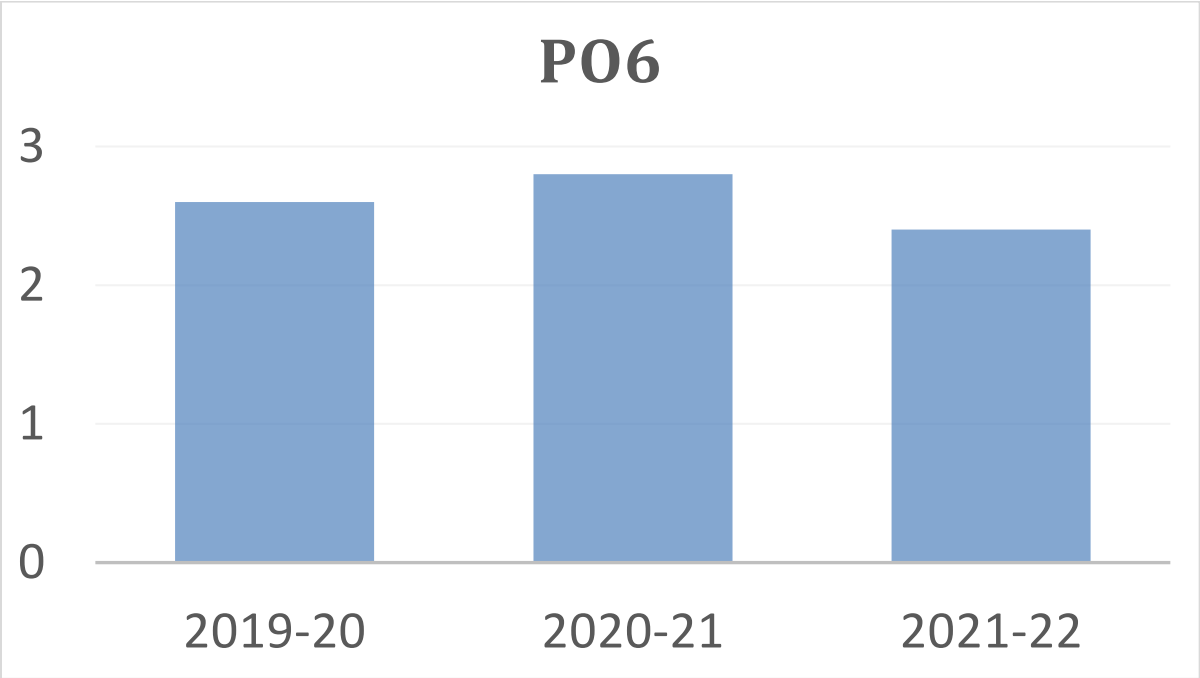
Actions taken for improvement

1. Students are encouraged to ask more questions in the classroom and laboratory.
2. More tutorial questions have been added to the tutorials sheet.

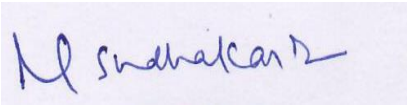


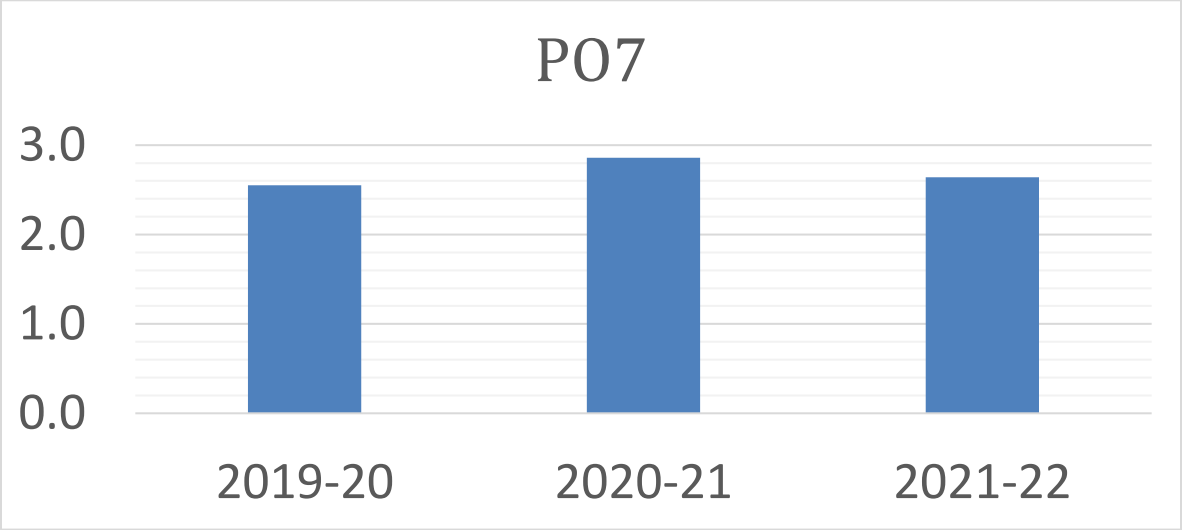
3. Animations and class demonstrations are given to the students.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

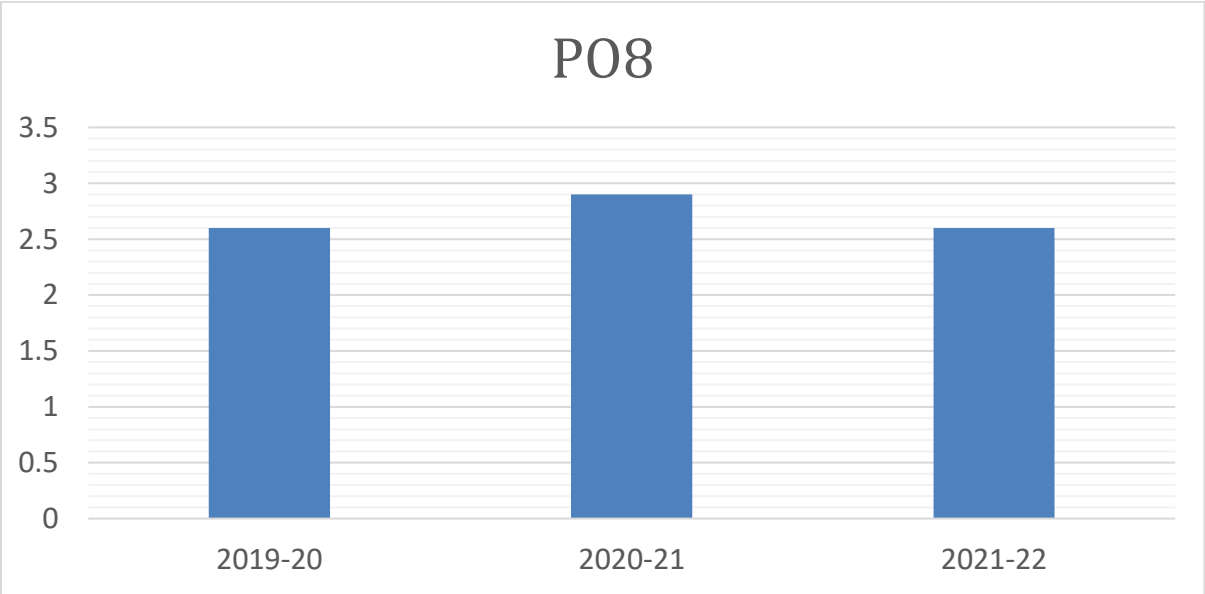


PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development.

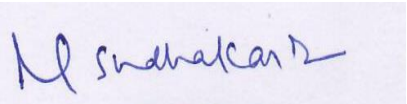




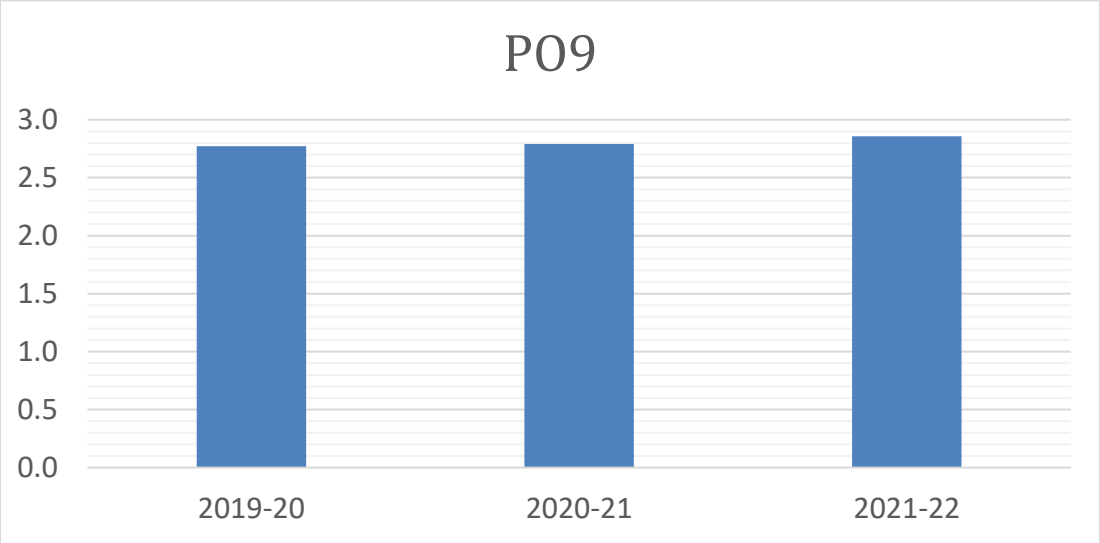
PO8: Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.



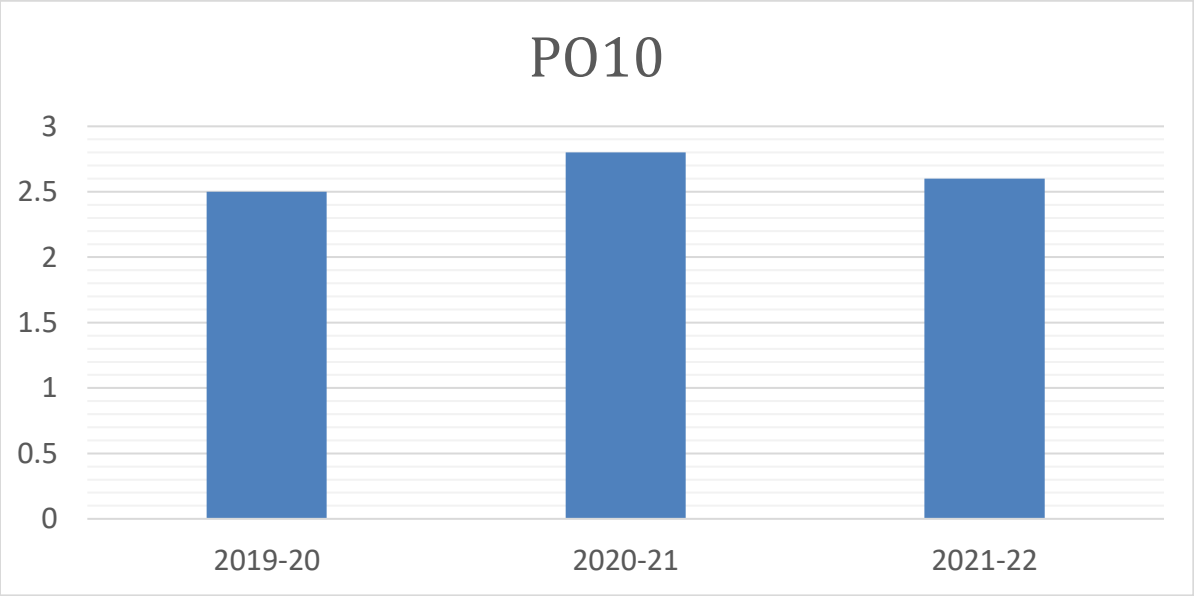
Action taken: For UBT501, detailed ATR is included in PO1, more emphasize will be given on instrumental data handling, professional responsibilities towards shared assets including instruments and detailed laboratory practical writing practices as per the industrial and academic standards.

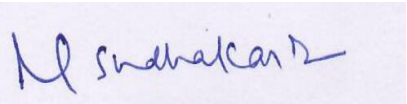


PO9: Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

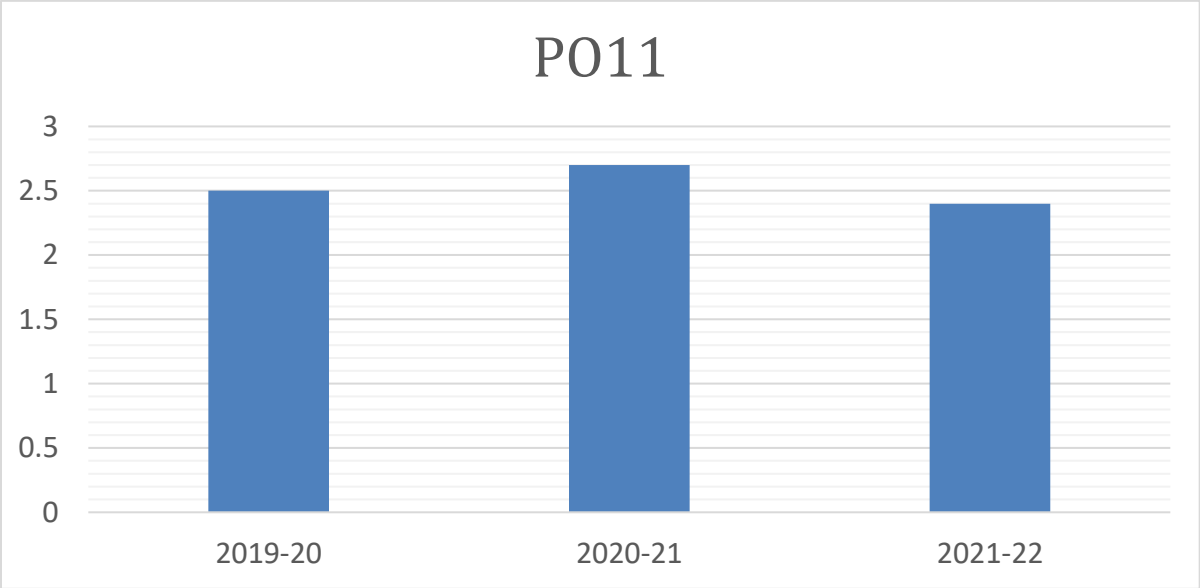


PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

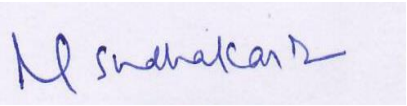


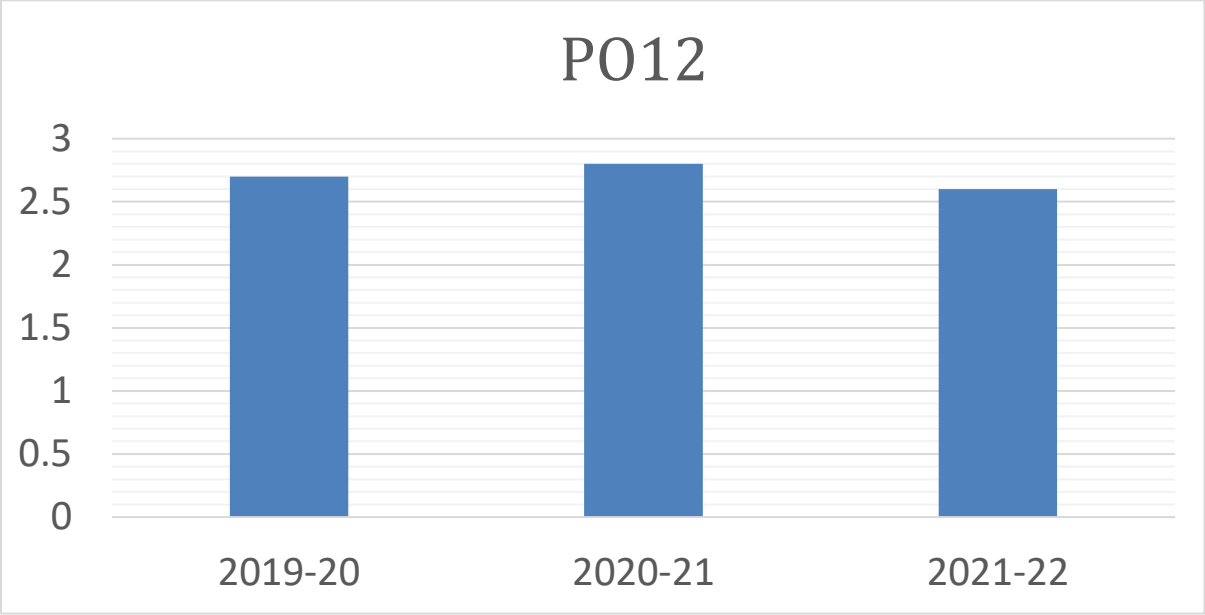


PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

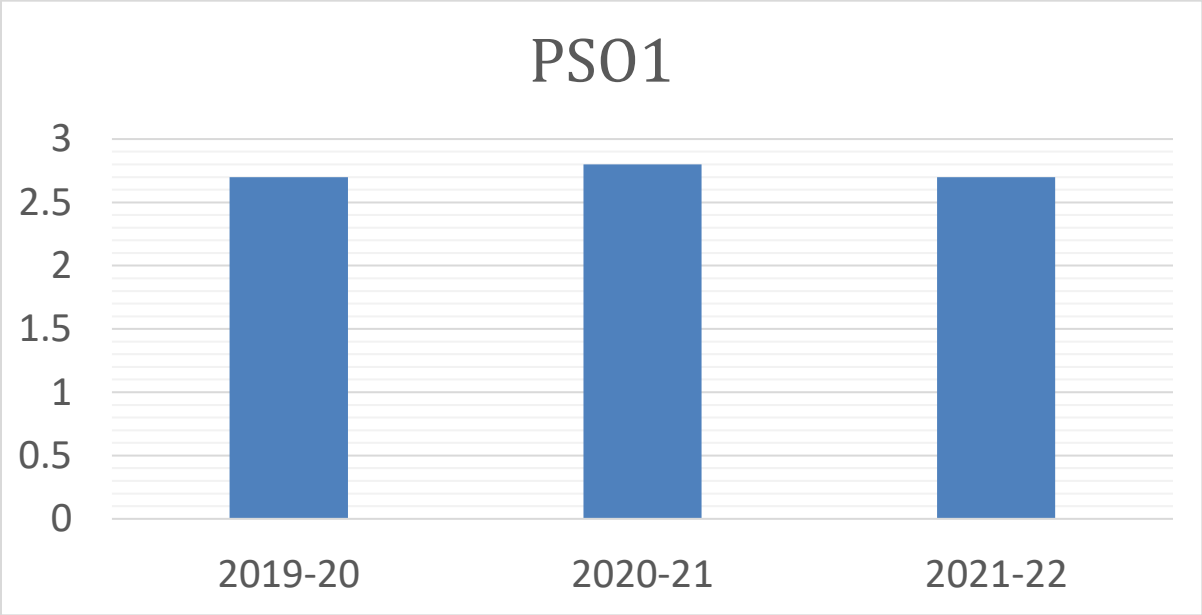


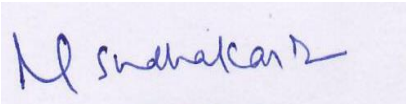
PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change



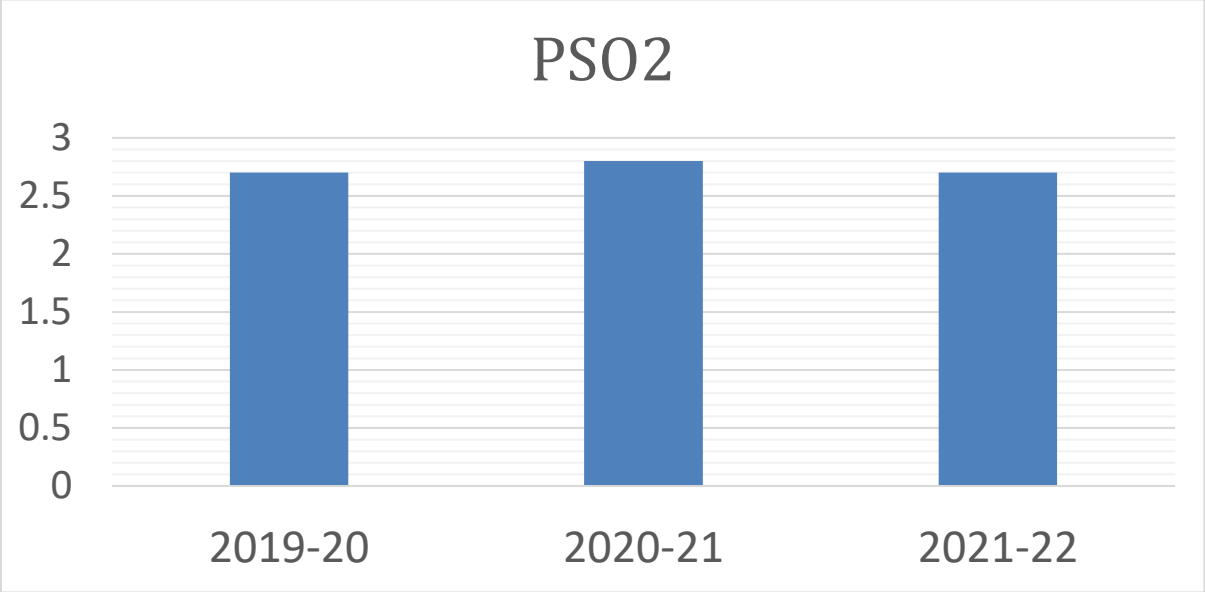


PSO1: Develop a comprehensive understanding of the principle of biotechnology using modern biology, applied sciences and technology acquire practical skills to investigate complex problems of biological systems as well as apply these for harnessing such systems.





PSO2: Empower with critical thinking skills apply appropriate biotechnological approaches using computational tools and competency in an interdisciplinary environment with professional ethics, adept in scientific communication and life-long learning.



Action Taken Report (ATR)

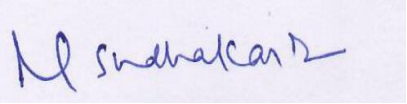
Course code: UBT609

Course name: Medical Biotechnology

Year: 2021-22

Name of faculty: Priyankar Dey

The attainment level for the CLO1 (statement: *explain insights about genetic diseases and about the molecular aspects related to human disease*) for the B.Tech. Biotechnology 2021-22 batch was calculated to be less than the attainment level. Upon discussing this with certain students those who have achieved marks, it was realized that the students failed to integrate the concepts of genetic abnormalities at the physical level, their consequences at the phenotypic levels and the physiological consequences. For this purpose, I planned to provide a refresher class on the fundamentals of genetic processes first, and then move to the concepts and mechanisms of genetic disease as per the course curriculum since the students are introduced to the genetics and molecular biology during the 2nd semester, and then taught genetic diseases at the 6th semester. However, since it would consume much of the planed class timing for a refresher course on fundamentals of genetic



disease, I plan to utilize audio-visual methods for these purposes. For example, following are the links of specific list of topics which I intend to teach for a rapid understanding/refreshening of the genetic disease:

Replication: https://www.youtube.com/watch?v=T1aR77FLdi0

Transcription: https://www.youtube.com/watch?v=Fftek5mIh28

Translation: https://www.youtube.com/watch?v=8Hsz_Vmcy-Y

Mutation: https://www.youtube.com/watch?v=mCOMD291oBM

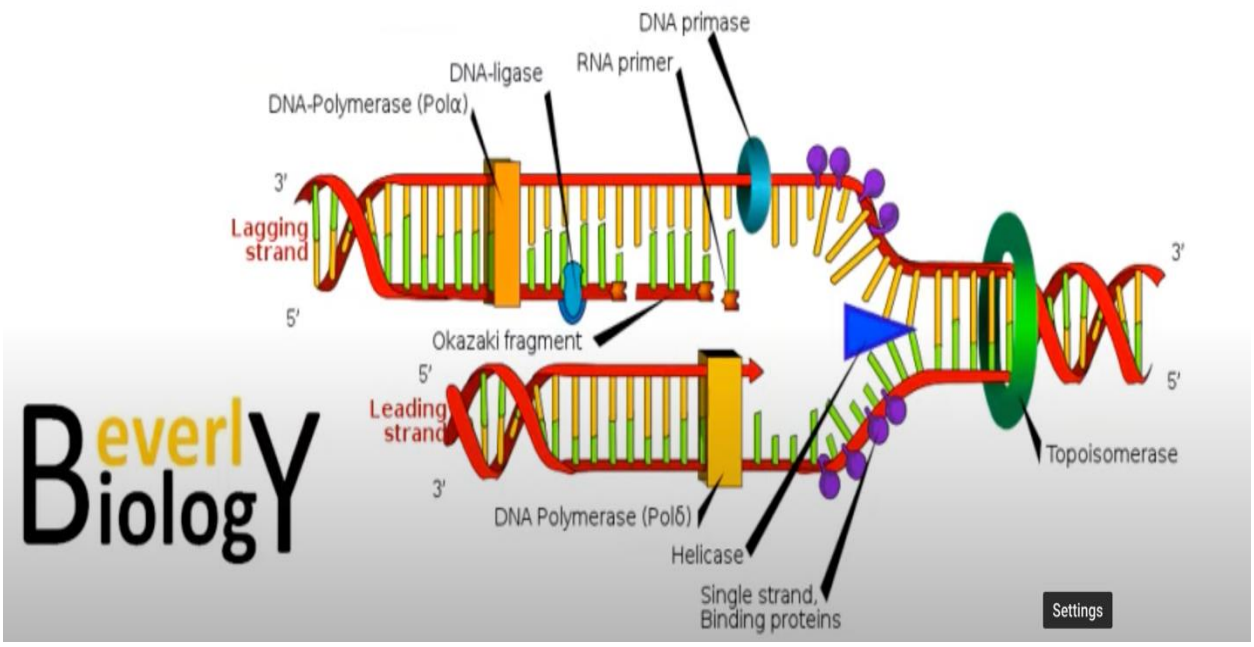
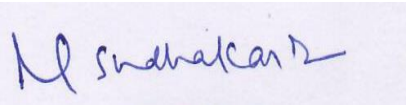


Figure. Representative image of audio-visual e-content from the internet. Link provided above.

I also intend to provide information on relevant books/study material available at the institute's central library for proper understanding of the fundamental concepts. Finally, since the integration of the laboratory learning and the theoretical concepts remains quintessential in achieving expertise in a subject, I also intend to discuss relevant examples of clinical studies during the practical sessions. The success of these teaching and learning strategies on the improvement of the CLO attainment level(s) is expected to the reflected in the coming semester.



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ANNEXURE-I

Example of Sample Survey form

Section 1 of 2

Attainment of Program Outcomes and Program Specific Outcomes- Alumni survey

This survey is regarding the attainment of Program Outcomes (POs) and Program Specific Outcomes (PSOs).

Email *

Valid email

This form is collecting emails. Change settings

Name *

Short answer text

Email ID *

Short answer text

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Section 2 of 2

Question 1-14

Please respond to the attainment of following POs and PSOs in a scale of 01 (Poor), 02 (Average), 03 (Excellent)

PO1. *Engineering Knowledge*: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

- O1 (Poor)
- 02 (Average)
- 03 (Excellent)

PO2. *Problem Analysis*: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

- 01 (Poor)
- 02 (Average)
- 03 (Excellent)

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PO3. *Design/Development of Solutions*: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- ◯ 01 (Poor)
- ◯ 02 (Average)
- ◯ 03 (Excellent)

PO4. *Conduct Investigations of Complex Problems*: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

- ◯ 01 (Poor)
- ◯ 02 (Average)
- ◯ 03 (Excellent)

PO5. *Modern Tool Usage*: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

- ◯ 01 (Poor)
- ◯ 02 (Average)

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PO6. ***The Engineer and Society*:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

- ◯ 01 (Poor)
- ◯ 02 (Average)
- ◯ 03 (Excellent)

PO7. ***Environment and Sustainability*:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- ◯ 01 (Poor)
- ◯ 02 (Average)
- ◯ 03 (Excellent)

PO8. ***Ethics*:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- ◯ 01 (Poor)
- ◯ 02 (Average)
- ◯ 03 (Excellent)

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PO9. ***Individual and Teamwork*:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- ◯ 01 (Poor)
- ◯ 02 (Average)
- ◯ 03 (Excellent)

PO10. ***Communication*:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- ◯ 01 (Poor)
- ◯ 02 (Average)
- ◯ 03 (Excellent)

PO11. ***Project Management and Finance*:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

- ◯ 01 (Poor)
- ◯ 02 (Average)
- ◯ 03 (Excellent)

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