



KASHI INSTITUTE OF TECHNOLOGY, VARANASI
DEPARTMENT OF BIOTECHNOLOGY

Submitted
By

REPORT OF CO - PO
ASSESSMENT AND ATTAINMENT
OF
FACULTY OF BIOTECHNOLOGY

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KASHI INSTITUTE OF TECHNOLOGY





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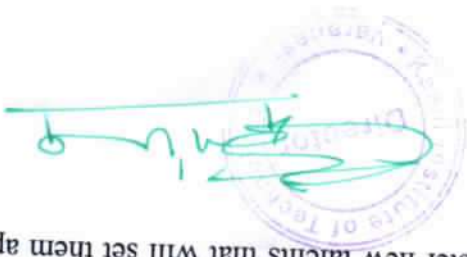
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CO-PO ASSESSMENT & ATTAINMENT

1. INTRODUCTION:

According to John Dewey, an American philosopher, psychologist and educational reformer, "Education is not preparation for life, education is life itself". Education is a form of teaching-learning-practicing in which the knowledge, skills and information are transferred from teachers to students. But the traditional system of education fails to measure the capability of the students. It only assesses the students learning by allowing them to reproduce the exact text presented in the text book as answer for questions. But the real need and demand of twenty first century learning system is the transition from Output Based Education to Outcome Based Education. Outcome Based Education (OBE) system is able to measure what the students are capable of doing. Indian education system has introduced the Outcome Based Education System through National Board of Accreditation (NBA). This is a model which not only gives much better technical knowledge to twenty first century Engineers, but also gives emphasis on the development of affective domain attribute which are needed in workplace, e.g. interpersonal skills, analytical skills, computer skills, organizational skills, leadership skills, self-confidence, creativity, strong work ethics, motivation, initiative, flexibility, adaptability and entrepreneurial skills. This report described the calculation of various courses like Engineering Physics, Engineering Chemistry, Engineering Mathematics-I, Elementary mathematics-I, Soft Skill, Fundamental of Mechanical Engineering & Mechatronics, Basic Electrical Engineering, Emerging Technology, Artificial Intelligence, Programming for Problem Solving, Emerging Domain in Electronics Engineering, etc), delivery methods to attain OBE in these Programs, presents assessment methods, attainment of Course Outcome (CO), Program Outcome (PO) & Program Specific Outcome (PSO). The goal of outcome-based education (OBE) is to have students demonstrate that they "know and are able to achieve" whatever they required outputs are by organizing and focusing the resources available in an educational system. OBE assists universities in tracking their students' academic progress and empowering them to master new talents that will set them apart from their peers throughout the world.



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The curriculum is revised as needed to meet the needs of today's students, rather than being repeated for the following generation of students.

The faculty is encouraged to focus on helping the students build new abilities rather than placing too much emphasis on getting everything done on the syllabus before the end of the semester. Additionally, students are evaluated based on the 'Levels' that track their learning skills rather than their grade. Success for all students and staff is the Outcome Based Education (OBE) principle, as stated by ensuring that every student has the skills, abilities, and qualities required for success after leaving the educational system. Organizing institution is a way that allows for the achievement and maximization of those outcomes for all students. Institutions adopting OBE attempt to carry changes to the educational program by progressively adapting to the requirements of the various stakeholders like Students, Parents, Industry Personnel and Recruiters.

This report described the calculation of various technical and non technical courses. Delivery methods to attain OBE in Engineering Program, presents assessment methods, attainment of course outcome (COs) and program outcome (POs).



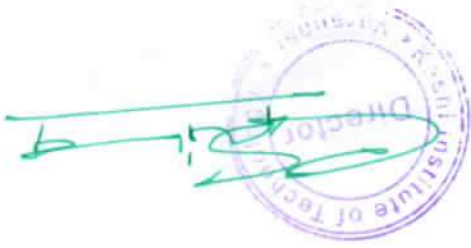
2- Institute Vision & Mission

Vision:

To empower young generation for substantial contribution to economical, technological and social progress of the society worldwide.

Mission:

- To contribute to the development of the human resources in the form of professional leaders of global cadre.
- To develop holistic personality of the learners.
- To make this Institute as a Leading Centre of Research.



VISION & MISSION OF THE DEPARTMENT

Vision:

To become a globally recognized department of higher learning by producing quality Engineers and Technologists in the field of Biotechnology Engineering.

Mission:

To advance and spread knowledge in the area of Biotechnology and Life Sciences through multidisciplinary teaching and research contributing to healthcare, food, energy and environment.



4-LEVELS OF OUTCOMES:

Terminology (Abbreviations)

• **Outcome-Based Education (OBE):** Outcome-Based Education (OBE) is a student-centric teaching and learning Methodology in which the course delivery, assessment are planned to achieve stated Objectives and Outcomes. It focuses on measuring student performance i.e. outcomes at different levels.

OBE is all about feedback and outcomes there are four levels of Outcomes from OBE are:

- 1-Course Outcomes (COs)
- 2-Program Outcomes (POs)
- 3-Program Educational Objectives (PEOs) 3-Program Specific Outcomes (PSOs)

•Course Outcomes (COs):

Course Outcomes (COs) are what the student should be able to do at the end of a course. The most important aspect of a CO is that it should be observable and measurable form of a set of individually assessable outcomes of the programme. Graduates Attributes (GAs) are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level.

•Program Outcomes (POs):

Program outcomes are statements that describe what the knowledge, skills and attitudes students should have at the time of graduation from an engineering program. That means just at the end of 4 years these represent what is the knowledge, skills and attitudes they should have.

•Program Educational Objectives (PEOs):

These are broad statements that describe the career and professional accomplishments in four to five years after graduation that the program is preparing the graduates to achieve.

•Program Specific Outcomes (PSOs):

Program Specific Outcomes are statements that describe what the students of a specific engineering program should be able to do.





Course Outcomes		S. No.
BL	Understanding the structure and uses of water and Buffer	CO1
	Understanding of the structure of carbohydrates and different pathways.	CO2
	Understanding the fatty acid and lipid formation pathways.	CO3
	To able to classify the amino acids and proteins on the basis of their structures.	CO4
	Understanding the de novo and salvage pathways.	CO5
		1, 2, 4

CO statements indicating what a student can do after the successful completion of a course. Every course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each module of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy. A well written CO facilitates lecturers in measuring the achievement of the CO at the end of the semester. It also helps the lecturers in designing suitable delivery and assessment methods to achieve the designed CO. Graduates Attributes (GAs) are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. Gas form a set of individually assessable outcomes of the programmed. For e.g. a course such as Biochemistry might have the following course outcomes set.

Course Outcomes (COs):

COURSE OUTCOME STATEMENT:

Biochemistry combines biology and chemistry to **study living matter**. It powers scientific and medical discovery in fields such as pharmaceuticals, forensics and nutrition. With biochemistry, you will study chemical reactions at a molecular level to better understand the world and develop new ways to harness these.

Course objective (Biochemistry):

1. Intended outcomes written to help guide instruction for what the students will learn in the course.
2. Course objectives are measurable objectives that the learner is expected to accomplish at the end of an instructional.
3. A statement of an action that a learner should be able to perform after successfully completing the learning material.

Course objectives Statement:

Course Outcomes & CO-PO Matrix of Various Course

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2021-22 ODD SEMESTER

Course Outcomes		Course- Biochemistry	
S. No.	Course Outcome/ Unit	BL	
Course Outcomes			
CO1	Understanding the structure and uses of water and Buffer	1,2	1,2
CO2	Understanding of the structure of carbohydrates and different pathways.	1,2	1,2
CO3	Understanding the fatty acid and lipid formation pathways.	1,2	1,2,4
CO4	To able to classify the amino acids and proteins on the basis of their structures.	1,2,4	1,2,4
CO5	Understanding the de novo and salvage pathways.	1,2,4	1,2,4
Course Outcomes			
Course- Techniques in Biotechnology		BL	
S. No.	Course Outcome/ Unit	BL	
Course Outcomes			
CO1	Understanding of working mechanism of different types of microscopy.	1,2	1,2
CO2	Understanding of the principle of different types of chromatography techniques.	1,2,3	1,2,3
CO3	Understanding the processes of spectroscopy and the application in biotechnology.	1,2,3	1,2,3
CO4	Different types of separation techniques for the nucleic acid and proteins.	1,2,3	1,2
CO5	Understanding the application of Biosensor in different areas.	1,2,3,4	1,2,3,4

Course Outcomes		Course- Microbiology and Immunology	
S. No.	Course Outcome/ Unit	BL	
Course Outcomes			
CO1	To classify and explain the structure and general characteristics of microorganism.	1,2	1,2
CO2	Understanding of the concept of viruses and virus reproduction system.	1,2	1,2
CO3	Understanding of the concept of Human body defense system.	1,2	1,2,4
CO4	Regulatory mechanism of interaction between different molecules.	1,2,4	1,2,3,4
CO5	Application of microbes and understanding of the different disease.	1,2,4	1,2,4

Course Outcomes		Course- Enzyme Engineering	
S. No.	Course Outcome/ Unit	BL	
Course Outcomes			
CO1	To be able to know about enzymes and enzyme kinetics.	1,2,3,4,5	1,2,3,4,5
CO2	To be able to differentiate enzyme inhibition processes.	1,2,3,4	1,2,3,4
CO3	Understanding of Downstream processing of enzymes.	1,2	1,2
CO4	Understanding the role of enzyme immobilization.	1,2,4	1,2,4
CO5	To be able to understand the Enzyme Biosensors and Enzyme reactors.	1,2,4	1,2,4

Course Outcomes		Course- Genetics and Molecular Biology	
S. No.	Course Outcome/ Unit	BL	
Course Outcomes			
CO1	Identification of gene and determination of sex chromosome.	1,2,4	1,2,4
CO2	To be able to differentiate between DNA and RNA sequences.	1,2	1,2
CO3	Understanding of the concept of central dogma.	1,2,3,4	1,2,3,4
CO4	Understanding the regulatory mechanism in bacteria.	1,2,4	1,2,4
CO5	To be able to know the application of r-DNA technology.	1,2,3,4	1,2,3,4



S.No.	COURSE OUTCOMES (CO)		Knowledge Level (Bloom's Level)
CO1	Understanding of Fluid properties and their behavior and mathematical analysis	L2: Understand L3: Applying	
CO2	Understanding of principle, working and application of flow measuring equipments	L4: Analyze L3: Applying	
CO3	Understanding the principle of conduction and convection and application	L5: Evaluate L3: Applying	
CO4	Understanding of diffusion and transient conduction.	L4: Analyze	
CO5	Understanding the principle of mass transfer in biological system and their practical applications.	L2: Understand L3: Applying	

Course outcomes- Bioprocess Engineering -I (KBT 401)



COURSE OUTCOME		S.NO.	COURSE OUTCOME/UNIT
COURSE 6 - ENERGY SCIENCE AND ENGINEERING (KOE 033)			
BL			
1	To Explain the basic principles of various renewable energy conversion processes and devices used therein.	3	
2	To expose the student to solar thermal, solar photovoltaic	2	
3	To expose the student to Geothermal Energy, Magneto-hydrodynamics (MHD) and fuel cell	2	
4	To expose the student to wind, tidal and renewable energy resources, conversion technologies, processes, systems and devices, and equip the student to take up projects in those areas.	2	
5	To expose the student to biomass renewable energy resources	2	

Course Outcomes		S.No.	Course Outcome/ Unit
Course -Technical Communication (KAS301)			
BL			
1	Student will be able to- Understand the nature and objective of technical communication relevant for the work place as engineers.		
2	Utilize the technical writing for the purpose of technical communication and its exposure in various dimensions.		
3	Imbibe inputs by presentation skills to enhance confidence in face of diverse audience.		
4	Create a vast know-how of the application of the learning to promote their technical competence.		
5	Evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.		

Course Outcomes		S.No.	Course Outcome/ Unit
Course -Universal Human Values (KVE301)			
BL			
1	To acquaint the students with legacies of constitutional development in India and help those to understand the most diversified legal document of India and philosophy behind it.		
2	To make students aware of the theoretical and functional aspects of the Indian Parliamentary System.		
3	To channelize students' thinking towards basic understanding of the legal concepts and its implications for engineers.		
4	To acquaint students with latest intellectual property rights and innovation environment with related regulatory framework.		
5	To make students learn about role of engineering in business organizations and e-governance.		

Course -Math V (KAS404)	
S.No.	Course Outcome/ Unit
	Student will be able to-
1	Understand the concept of Fourier Transform and Z-Transform to apply for solving with the help of transform problems.
2	Remember the concept of Probability to evaluate Probablity distribution.
3	To analyze the concept of numerical techniques to evaluate the zero's of the function interpolation
4	Apply the concept of hypothesis to evaluate various hypothesis testing.
5	Remember the concept of design and statistical quality control to create control charts.
	Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create
	K1 & K6
	K3 & K5
	K4 & K5
	K1 & K3
	K2 & K3



Program Outcomes (POs):

POs are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal engineering program should have. Graduates Attributes (GAs) are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. GAs form a set of individually assessable outcomes of the program. The NBA laid down the graduate attributes relating to program outcomes and is to be derived by Program. These are broad and cover a wider area than of COs. 12 Program Outcomes, or Graduate Attributes for the sake of unity and quality assurance.

The Program outcomes reflect the ability of graduates to demonstrate knowledge in fundamentals of Basic Sciences, Humanities and Social Sciences, Engineering Sciences and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of graduation. The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society. These outcomes also enable the graduate to pursue higher studies and engage in R&D for a successful professional career. The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, design, development, production and testing of novel products, ability to deal with finances and project management during his/her early professional career of 3 to 4 years.



PROGRAM OUTCOMES (Pos)

- PO1: Biotechnological knowledge**
Graduates will learn and apply knowledge of Biotechnology, Science and Engineering concepts to solve problems related to field of Biotechnology.
- PO2: Problems analysis**
Graduates will identify, analyze and understand problems related to biotechnology to find valid conclusions.
- PO3: Design/development of Solutions**
Graduates will be able to design and innovate solution to Biotechnological problems by applying appropriate tools while keeping in mind safety and ethical factor for environmental & society.
- PO4: Conduct investigations of complex problem**
Graduates will be able design, perform experiments, analyze and interpret data for investigating complex problems in biotechnology Engineering and related fields.
- PO5: Modern tool usage**
Graduates will be able to decide and apply appropriate tools and techniques in biotechnological manipulation.
- PO6: The Engineer and Society**
Graduates will be able to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological engineering practices
- PO7: Environment and sustainability**
Graduates will be able to understand the need and impact of biotechnological solutions on environment and societal context keeping in view need for sustainable solution.
- PO8: Ethics**
Graduates will have knowledge and understanding of related norms and ethics in Biotechnology Engineering product/technique development.
- PO9: Individual and team work**
Graduates will be able to undertake any responsibility as an individual and as a team in a multidisciplinary environment.
- PO10: Communication**
Graduates will develop oral and written communication skills.
- PO11: Project Management and Finance**
Graduates will have thorough knowledge in Biotechnology Engineering and will also be ready to engage themselves in lifelong learning.
- PO12: Life-long Learning**
Graduates will be able to demonstrate knowledge of project and finance management when dealing with Biotechnology Engineering problems.



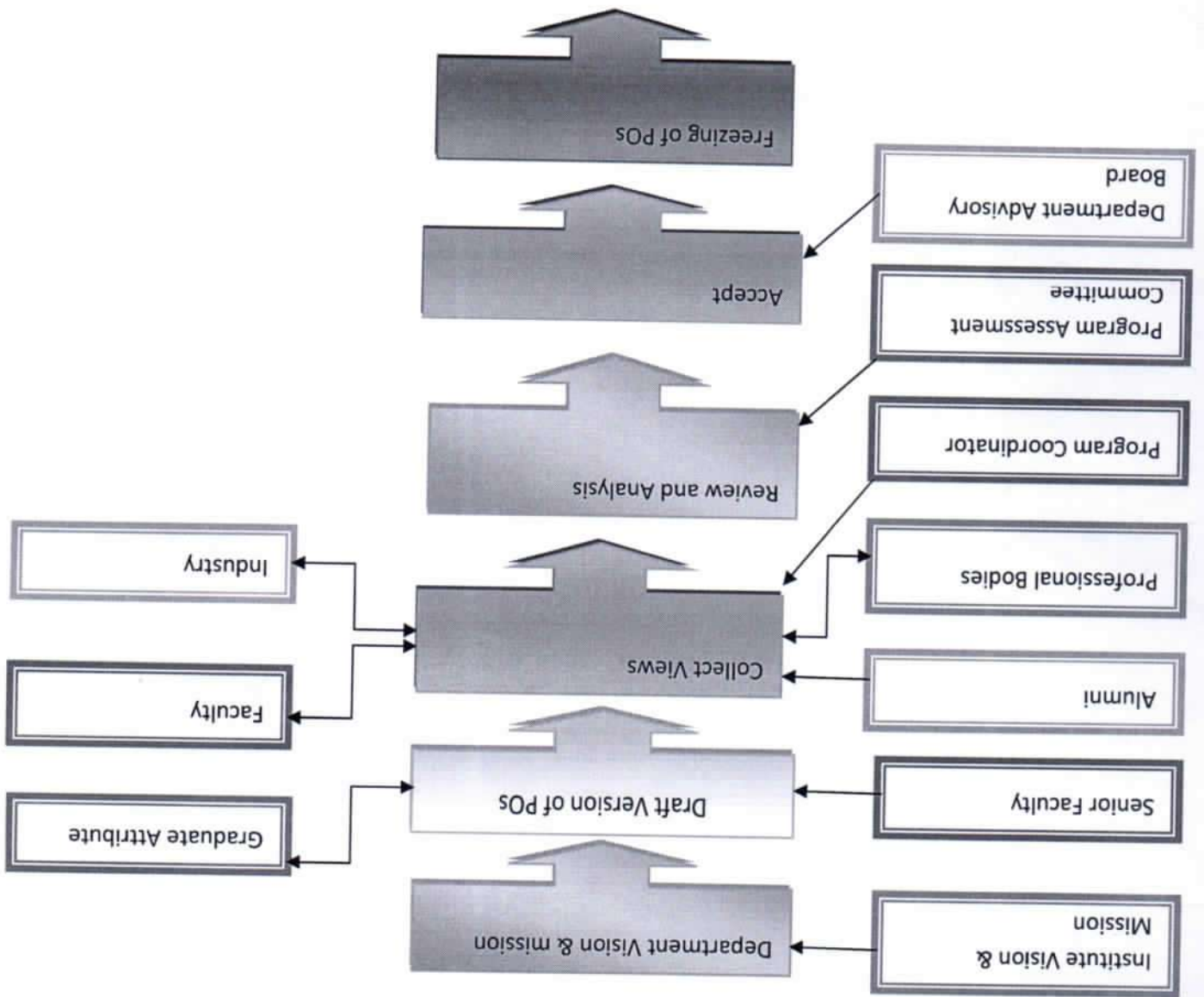


Fig.1

Process to define Program Outcomes (POs) of the department :

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

Program Educational Objectives (PEO) are statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve. PEO's are measured 4-5 years after graduation. They are set in order to measure the effectiveness of the program, and to check whether it has prepared the students to deal with the real world, where they could apply and use the skills and knowledge they've learned to good use.

PEO1 - PROFICIENT DEVELOPMENT

To develop in the students the capacity to obtain knowledge on Mathematics, Science and Engineering and apply it expertly inside sensible requirements, for example, financial, natural, social, political, moral, wellbeing and security, manufacturability and manageability with due moral obligation.

PEO2-CORE PROFICIENCY

To provide ability to recognize, plan, appreciate formulate, comprehend, analyze, design and solve engineering problems with hands on experience in different advancement involving modern tools necessary for engineering practice to fulfill the necessities of society and the business.

PEO3 - SPECIALISED ACHIEVEMENT

To furnished the students with the capacity to explore, reenact, design, simulate, experiment, analyze, optimize and interpret in their core applications through multi disciplinary ideas and contemporary figuring out how to incorporate them into industry prepared graduates..

PEO4 - PROFESSIONALISM

To provide training, exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude towards ethical issues, team work, responsibility, accountability, multidisciplinary approach and capability to relate engineering issues to broader social context.

PEO5 - LEARNING ENVIRONMENT

To furnish students with an academic environment and make them mindful of greatness, foster the desire of revelation, imagination, creativity, authority, composed moral codes and rules and the long lasting figuring out how to turn into an effective expert in Biotechnology Engineering.



The Process for Establishing the PEO's

The PEOs are established through the following process steps:

- STEP 1:** Vision and Mission of the Institute & Department are taken into consideration to interact with various stake holders, and establish the PEO's
- STEP 2:** The Head of the Department, Program Coordinator and other Senior Faculty prepares the draft version of PEOs and POS.
- STEP 3:** The draft rendition is examined with partners and their perspectives are gathered by the Program co-ordinator

STEP 4 : The Program Assessment Committee surveys and dissects the PEOs and POS and presents its recommendations to the Departmental advisory Board.

STEP 5: The Departmental advisory Board deliberates on the recommendations and freezes the PEOs and POS and submits them to the BOG for final approval. The Program curriculum is planned by integrating inputs from members of Board of Studies and Academic council who are drawn from various academic institutions, R&D associations and industry.

PROGRAM SPECIFIC OUTCOMES (PSOs):

The graduates of the department will attain:

PSO 1: Graduates obtain position in successful career in industry, research institutions, academic, government organizations and entrepreneurship.

PSO 2: Graduates to be professionally competent in biotechnology to solve the problems in environmental, food, biochemical and biomedical engineering.

PSO 3: Graduates should be able to do creative research and develop new technologies in the field of biotechnology, which can contribute to the industry and to academia.



Fig.2 Relating Outcomes (CO-PO & PSO-PEO)

This figure shows the building block of CO-PO & PSO-PEO Relationship. After CO statements Develop by course in-charge, CO will map with any possible POs based on the relationship exist between them. But all POs are not necessary mapped with one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

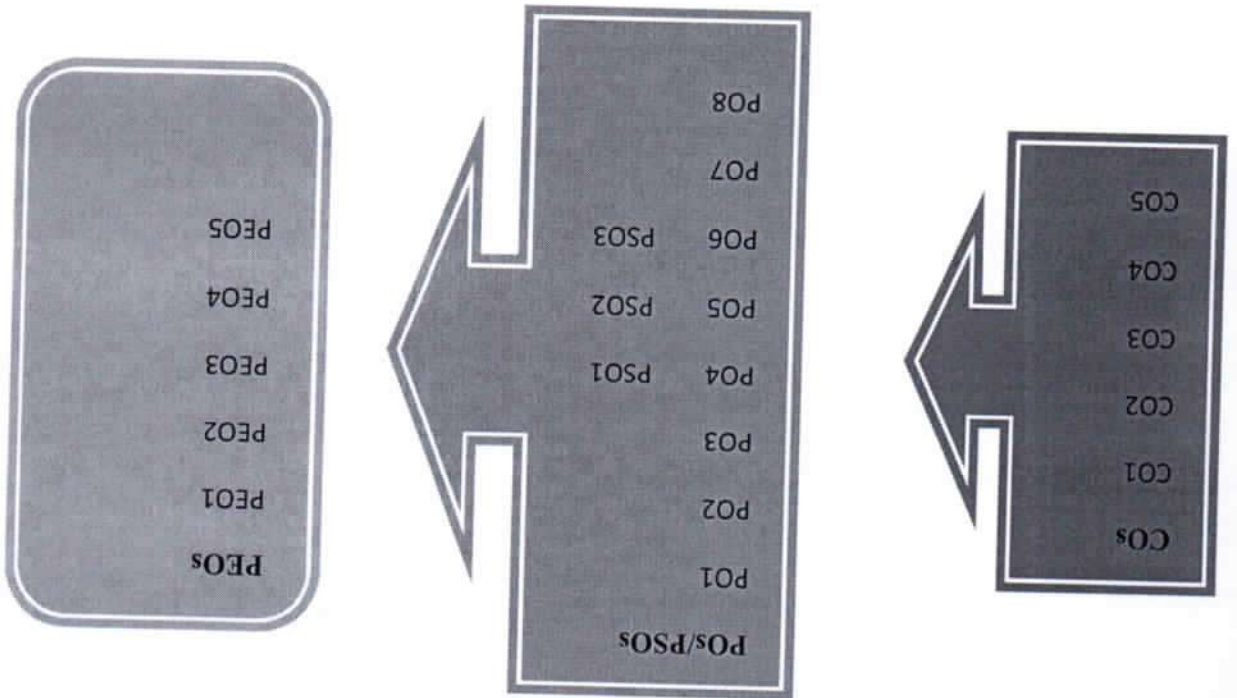


Fig.3 Relationship between CO, PO, PSO & PEO

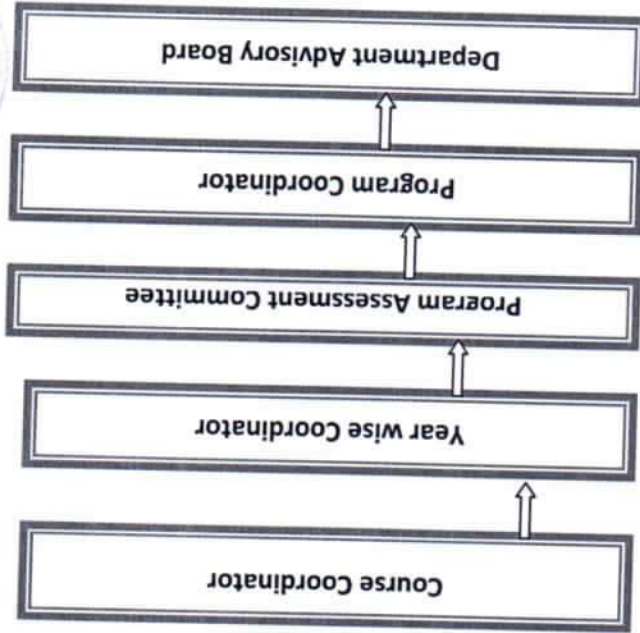


Fig.4 Hierarchy of Faculty Involvement



- **Course Coordinator:** write appropriate COs and finalize the CO-PO mapping.
- **Year wise Coordinator:** Consolidate the CO attainment of the respective year.
- **Program Assessment Committee:** Consolidate the CO attainment and PO attainment of the respective program.
- **Program Coordinator:** Monitor and Guide the Program Assessment Committee.
- **Department Advisory Board:** All these works mention above have to be done under the supervision of Department Advisory Board.



Vision, Mission & PEO are published & disseminated at following places:

Sr. No.	Place of Dissemination	Item	Dissemination Detail
1	College Website	Vision, Mission, PEO	Permanent
2	Depart Area	Vision, Mission, PEO	Permanent
3	Laboratory Area	Vision, Mission, PEO	Permanent
4	Notice Board	Vision, Mission,	Permanent
5	Employer Survey Form	Vision, Mission, PEO	When Required
6	Bulk SMS	Vision, Mission,	At New Admission
7	Email	Vision, Mission,	Footer in Every Mail
8	Home Page of ERP	Vision, Mission,	Permanent
9	Laboratory Manuals	Vision, Mission,	Permanent
10	Faculty Meetings	Vision, Mission, PEO	At regular interval
11	In Alumni Interactions	Vision, Mission, PEO	Alumni Meet
12	Back Grounds of all Computers in the Department	Vision, Mission	Permanent

The Process for Updating Vision and Mission of Department:

The following steps are followed to establish Vision and Mission of Department.

Step 1: The Institute's Vision & Mission serve as the starting point in Step 1.

Step 2: The Department holds faculty discussions about the skill sets required by regional and global employers, industry technological breakthroughs, and R & D. A draft of the Department's vision and mission statements is also created in accordance with suggestions made by the Departmental Planning Committee.

Step 3: The draft version is changed in light of feedback from the Departmental Planning Committee, parents, professional organizations, and industry representatives.

Step 4: To ascertain whether the accepted points of view are congruent with the institute's vision and goal. Should the Central Advisory Committee deem the Vision and Mission to be unsatisfactory move on to step 5.

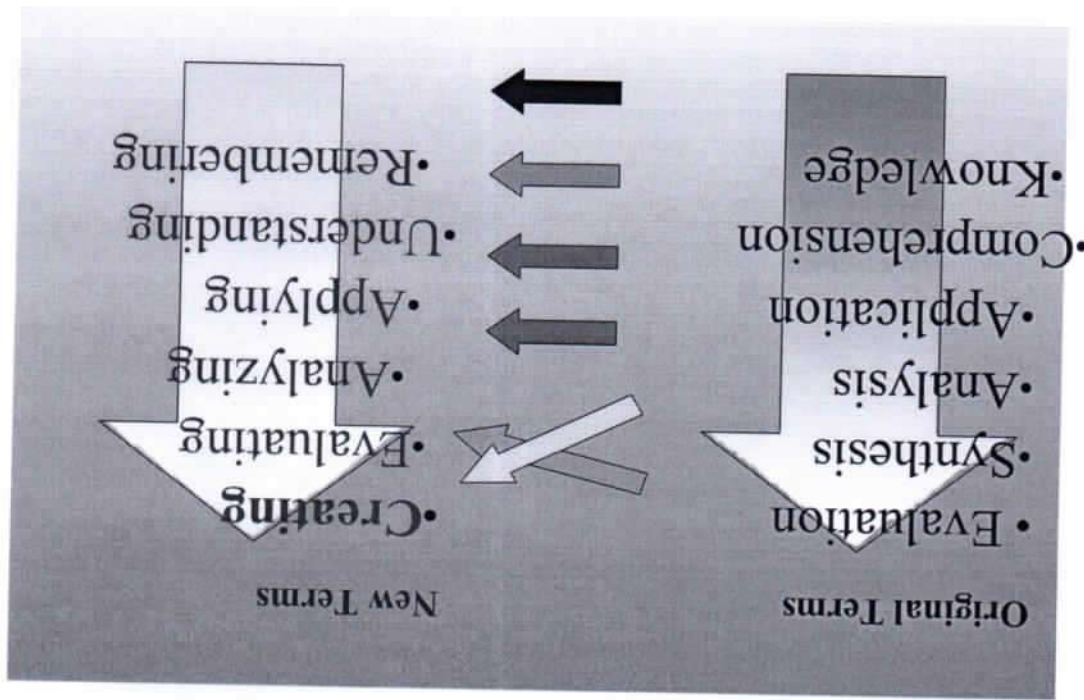
Step 5: The Central Advisory Committee will again request changes from the Departmental Planning Committee if it is not happy with the Vision and Mission.

Step 6: The Vision and Mission are approved and made public among the stakeholders if they meet the requirements of the Central Advisory Committee.



Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr. Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training and learning processes.

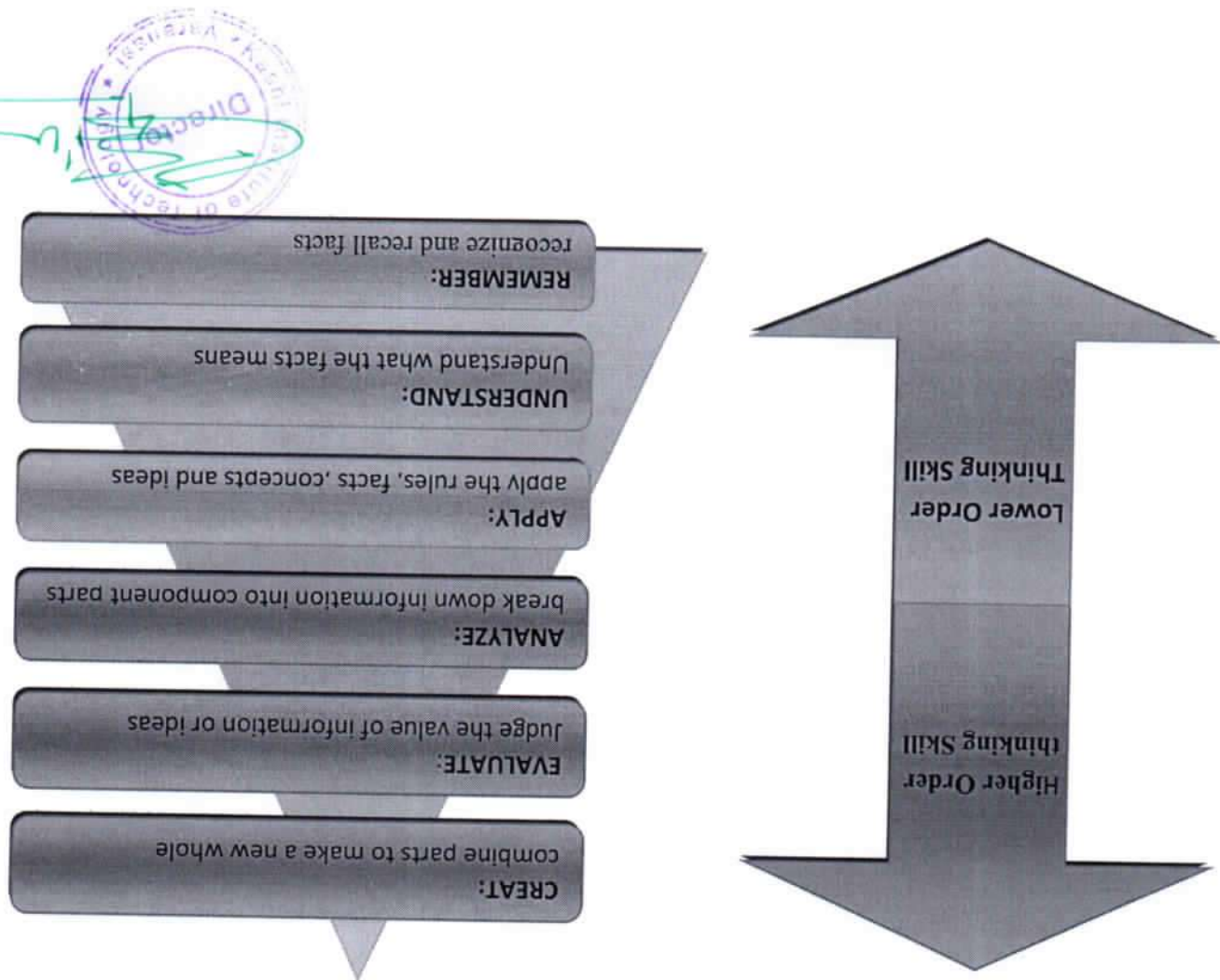
5- Revised Bloom's Taxonomy (fig.5)



Critical thinking is a skill that you are expected to develop as you progress through University. Critical thinking will become part of your research, your reading, your planning and reflection and of your academic writing. It involves a set of skills and an attitude of mind that you will need to cultivate and practice - it won't necessarily come easily or naturally! If you can develop critical thinking skills in relation to your subject, they will be valuable to you in many other aspects of life (including employment).

Bloom's taxonomy of thinking and learning illustrates forms of thinking, in ascending order of complexity, from lower-order thinking skills (LOTS) to higher-order thinking skills (HOTS). It begins with **remembering** and ends with **creating**. This is used by lecturers to set learning outcomes and assessment criteria for a course or module; you will often find these verbs in your module handbooks. The knowledge about a subject alone, like having access to a range of information, or 'facts', is at the simplest or lowest level. So using only, or mostly, descriptive language in your writing, to communicate what you know about a topic is not likely to generate many marks. Higher and more complex levels include the ability to analyze, synthesize and evaluate information by comparing and contrasting different points of view, sets of information or experiences. This might involve recognizing patterns of behavior, for example, and using them to make predictions.

BLOOM'S REVISED TAXONOMY OF THINKING SKILLS Fig.6



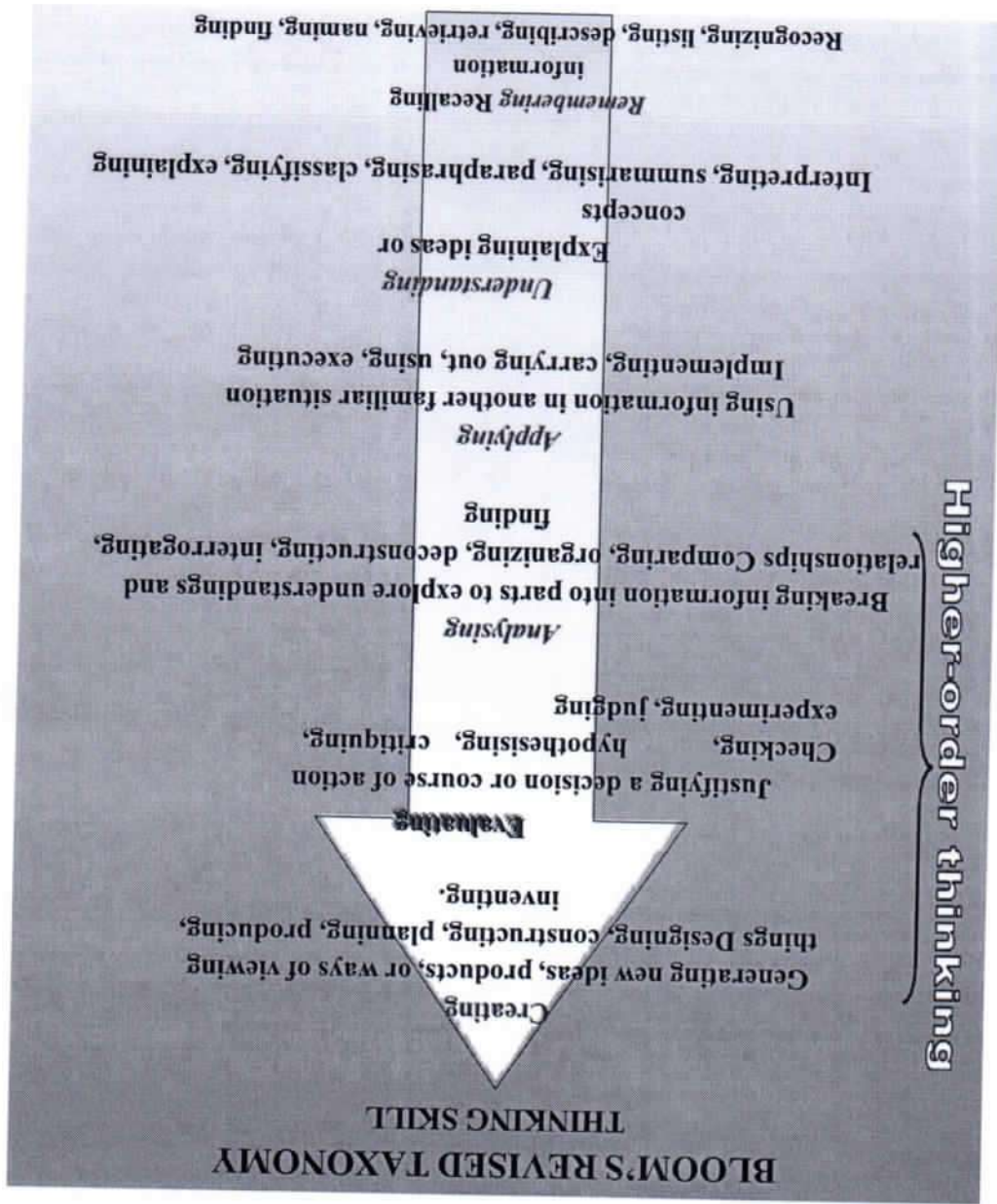


Fig.7



Cognitive processes:

Level 1 - C1	
Categories & Cognitive Processes	Alternative Names
Remember	Retrieve knowledge from long-term memory
Recognizing	Identifying Locating knowledge in long-term memory that is consistent with presented material
Recalling	Retrieving Retrieving relevant knowledge from long-term memory

Level 2- C2	
Categories & Cognitive Processes	Alternative Names
Understand	Construct meaning from instructional messages, including oral, written, and graphic communication
Interpreting	Clarifying Paraphrasing Representing Translating Changing from one form of representation to another
Exemplifying	Illustrating Instantiating Finding a specific example or illustration of a concept or principle
Classifying	Categorizing Subsuming Determining that something belongs to a category
Summarizing	Abstracting Generalizing Abstracting a general theme or major point(s)
Infering	Concluding Extrapolating Interpolating Predicting Drawing a logical conclusion from presented information
Comparing	Contrasting Mapping Matching Detecting correspondences between two ideas, objects, and the like
Explaining	Constructing models Constructing a cause and effect model of a system

Level 3 – C3	
Categories & Cognitive Processes	Alternative Names
Definition	
Apply	Applying a procedure to a familiar task
Executing	Carrying out Applying a procedure to a familiar task
Implementing	Using Applying a procedure to an unfamiliar task



Level 6 – C6

Producing	Constructing	Inventing a product
Planning	Designing	Devising a procedure for accomplishing some task
Generating	Hypothesizing	Coming up with alternative hypotheses based on criteria
Create		Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure
Categories & Cognitive Processes	Alternative Names	Definition

Level 5 – C5

Evaluate		Make judgments based on criteria and standards
Checking	Coordinating Detecting Monitoring Testing	Detecting inconsistencies or fallacies within a process or product; determining whether a process or product has internal consistency; detecting the effectiveness of a procedure as it is being implemented
Comparing	Judging	Detecting inconsistencies between a product and external criteria; determining whether a product has external consistency; detecting the appropriateness of a procedure for a given problem

Level 4 – C4

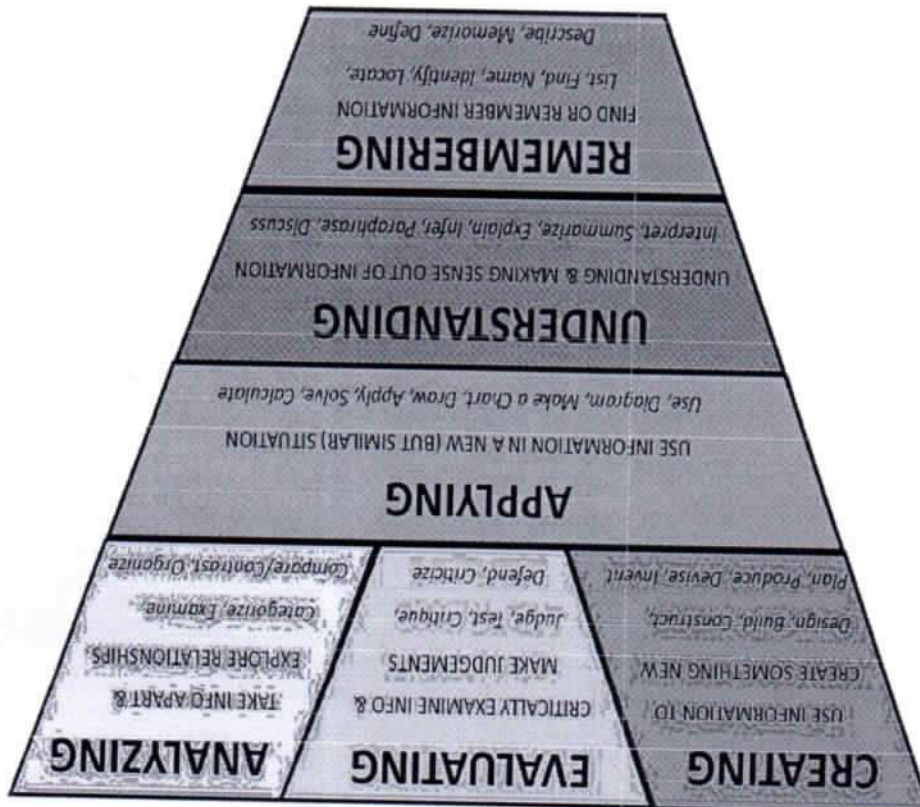
Analyze		Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose
Differentiating	Discriminating Distinguishing Focusing Selecting	Distinguishing relevant from irrelevant parts or important from unimportant parts of presented material
Organizing	Finding coherence Integrating Outlining Parsing Structuring	Determining how elements fit or function within a structure
Attributing	Deconstructing	Determine a point of view, bias, values, or intent underlying presented material



Met cognitive Knowledge	Knowledge of cognition in general as well as awareness and knowledge of one's own cognition
Procedural Knowledge	How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods
Conceptual Knowledge	The interrelationships among the basic elements within a larger structure that enable them to function together
Factual Knowledge	The basic elements students must know to be acquainted with a discipline or solve problems in it
Dimension	Definition

The Knowledge Dimension

Fig.8 Pictorial representation of Blooms Taxonomy



Cognitive Process 1 : To Remember

Remembering consists of recognizing and recalling relevant information from long-term memory.

Verbs associated with this level:

Choose, define, describe, find, identify, label, list, locate, match, name, recall, recite, recognize, record, relate, retrieve, say, select, show, sort and tell

Cognitive Process 2 : To understand

Understanding is the ability to make your own meaning from educational material such as reading and teacher explanations. The sub-skills for this process include interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.

Verbs associated with this level:

Categorize, clarify, classify, compare, conclude, construct, contrast, demonstrate, distinguish, explain, illustrate, interpret, match, paraphrase, predict, represent, reorganize, summarize, translate and understand.

Cognitive Process 3 : To apply

Applying refers to using a learned procedure either in a familiar or new situation.

Verbs associated with this level:

Apply, carry out, construct, develop, display, execute, illustrate, implement, model, solve and use.

Cognitive process 4 : To Analyze

To analyze is to break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose. Students analyze by differentiating, organizing, and attributing.



Verbs associated with this level:
Analyze, ascertain, attribute, connect, deconstruct, determine, differentiate, discriminate, dissect, distinguish, divide, examine, experiment, focus, infer, inspect, integrate, investigate, organize, outline, reduce, solve (a problem) and test for.

Cognitive Process 5: To evaluate

To evaluate is to make judgments based on criteria and standards.

Verbs associated with this level:

Appraise, assess, award, check, conclude, convince, coordinate, criticize, critique, defend, detect, discriminate, evaluate, judge, justify, monitor, prioritize, rank, recommend, support, test, value.

Cognitive Process 6: To Create

To create is to put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure; inventing a product. This skill involves putting things together to make something new. To accomplish creating tasks, learners generate, plan, and produce.

Verbs associated with this level:

Adapt, build, compose, construct, create, design, develop, elaborate, extend, formulate, generate, hypothesize, invent, make, modify, plan, produce, originate, refine, transform.



CO - PO AND CO - PSO MAPPING OF COURSES: Mapping Factor (Correlation Level)

The role of CO-PO mapping will be assigned to the faculty as per hierarchy. The course in-charge is responsible for writing the necessary COs for their corresponding course after receiving the department's course (subject) allocation. COs will be created utilizing the action verbs of the various learning levels. CO statements that are relevant to the skills, knowledge, and behavior that students will learn during the end of each course should be more specific and quantifiable.

After writing the CO statements, CO will be mapped with PO of the department. If the department is having more than one section in a year or the same course is available for more than one program of the same institute in a semester, the subject expert will be nominated as course coordinator of the corresponding course. The role of the course coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the COs of the respective year and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual students' extra-curricular and co-curricular activities. These details will hand over to the program coordinator in order to evaluate PO attainment of the individual student as well as individual course at the end of the 8th semester. The Program coordinator has to evaluate the PO attainment of individual student through direct and indirect method after the student completing their program. All these works have to be done under the guidance of Department Advisory Committee (DAC).

CO - PO mapping indicates to what extent a certain component (either assessment method to CO or CO to PO or PO to PEO & PSO are correlated to each other. Course correlation matrix shows the **Learning Relationship** (level of learning achieved) between COs and POs of a course. This matrix also strongly indicates whether the students are able to achieve the course outcomes/objectives. All the courses together must cover all the POs and PSOs. For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix. The matrix can be used for any course and it is good method to evaluate a course syllabus. The various correlation levels are:

- * 3- indicates Substantial (high) mapping (high contribution towards attainment)
- * 2- indicates Moderate (medium) mapping (medium contribution towards attainment)
- * 1- indicates Slight (low) mapping (some contribution towards attainment)
- * “-” indicates there is no correlation.

Procedure followed while assigning the values by Mapping COs to POs:
Judging the importance of the particular COs in relation to the POs.

- If the CO matches strongly with a particular PO criterion then Assign 3.
- If it matches moderately then Assign 2.
- If the match is low then Assign 1.





- If there is no correlation between any CO with PO else mark with '-'? **Symbol**
 - If an action verb used in a CO is repeated at multiple Blooms levels, then we need to judge which Blooms level is the best fit for that action verb the first five POs are purely of **technical** in nature, while the other POs are **non-technical**.
 - Writing the COs, we need to restrict ourselves between Blooms Level 1 to Level 4. Again, if it is a programming course, restrict between Blooms Level 1 to Level 3 but for the other courses, we can go up to Blooms Level 4.
 - For the laboratory courses, while composing COs, we need to restrict our self between Blooms Level 1 to Level 5.
 - Only for Mini-project and Main project, you may extend up to Blooms Level 6 while composing COs.
- Note:** * The table given below gives information about the action verbs used in the POs and the nature of POs, stating whether the POs are technical or non-technical. We need to understand the intention of each POs and the Bloom's level to which each of POs and the Blooms level to which each of these action verbs in the POs correlates to. Once you have understood the **POs** then you can write the COs for a course and see to what extent each of those COs correlate with the POs.

Table -1 : Process for mapping the values for CO-PO Matrix

Type	POs	Action Verb(s) in POs	Bloom's Level(s) for POs	Blooms Level(s) for COs	Type	Thumb Rule			
Technical	PO1	Apply	L3	Blooms L1 to L4 for Theory Courses	PO7	If Blooms L1 Action Verbs of a CO > Correlates any of PO7 to PO12 - > then Assign 1			
		Identify	L2						
		Formulate	L6						
	Review	L2	PO8	If Blooms L2 Verbs of a CO > Correlates any of PO7 to PO12 - > then Assign 2					
	Design	L3,L6							
	Develop	L3,L6							
	PO2	Design	L3,L6	Blooms L1 to L5 for Laboratory Courses	Non Technical	PO9	If Blooms L2 Verbs of a CO > Correlates any of PO7 to PO12 - > then Assign 2		
		Analyze	L4						
		Interpret	L2, L3						
	PO3	Design	L3,L6	Blooms L1 to L6 for Mini Project and Major Project				PO10	If Blooms L4 Action Verbs of a CO > Correlates any of PO7 to PO12 - > then Assign 3
		Develop	L3,L6						
		Design	L6						
PO4	Design	L6	PO11	PO10	If Blooms L4 Action Verbs of a CO > Correlates any of PO7 to PO12 - > then Assign 3				
	Create	L6							
	Select	L1, L2 L6							
PO5	Apply	L3				PO12	PO11	If Blooms L4 Action Verbs of a CO > Correlates any of PO7 to PO12 - > then Assign 3	
	Apply	L3							
	Apply	L3							
PO6	Apply	L3	PO12	PO11	If Blooms L4 Action Verbs of a CO > Correlates any of PO7 to PO12 - > then Assign 3				
	Assess	L5							
	Assess	L5							





CO-PO & PSO MAPPING FOR CO-PO MATRIX: SAMPLE

DEPARTMENT OF BIOTECHNOLOGY																	
Course: B.Tech. KBT 301																	
Semester: III																	
Academic Year: 2021-2022																	
Course Name : Techniques in Biotechnology																	
CO-PO & PSO MAPPING																	
CO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO
1	2	3	4	5	6	7	8	9	0	1	2	1	2	1	2	3	PSO
1	2	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
4	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
5	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2
CO	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	3

DEPARTMENT OF BIOTECHNOLOGY																	
Course: B.Tech. KBT302																	
Semester: III																	
Academic Year: 2021-2022																	
Course Name : Microbiology and Immunology																	
CO-PO & PSO MAPPING																	
CO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO
1	2	3	4	5	6	7	8	9	0	1	2	1	2	1	2	3	PSO
1	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	3
2	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2
3	1	1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	3
4	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
5	1	1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	3
CO	1	2	1	2	3	1	1	1	1	1	1	1	1	1	1	1	3

Course : B.Tech.
Course Code : KBT303

Semester: III

Academic Year:2021-2022
Course Name : Biochemistry

CO-PO & PSO MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	-	1	-	2	2	-	-	-	-	-	-	-	-	1	3
CO 2	-	1	-	1	2	-	-	-	-	-	-	-	-	-	2
CO 3	1	1	1	2	3	-	-	-	-	-	-	-	1	1	3
CO 4	-	1	1	2	2	-	-	-	-	-	-	-	1	1	3
CO 5	1	1	1	2	3	-	-	-	-	-	-	-	2	2	3

DEPARTMENT OF BIOTECHNOLOGY ENGINEERING

CO-PO ATTAINMENT

Course : B.Tech.
Course Code : KOE303

Semester: 3

Academic Year:2021-2022
Course Name : ESE

CO-PO & PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2	2	-	-	-	-	-	-	-	-	3	1	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	3	1	-
CO3	2	-	1	-	-	-	-	-	-	-	-	-	1	-	-
CO4	1	1	1	-	-	-	-	-	-	-	-	-	-	1	-
CO5	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-

DEPARTMENT OF BIOTECHNOLOGY

CO-PO ATTAINMENT

Course: B.Tech.
Course Code : KAS 301

Semester: 3

Academic Year:2021-2022
Course Name : Technical Communication

CO-PO & PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	1	1	2	2	2	2	2	1	-
CO2	-	-	-	-	-	-	-	1	1	3	3	2	1	2	-
CO3	-	-	-	-	-	-	-	1	2	3	2	2	1	1	-
CO4	-	-	-	-	-	2	1	-	1	3	2	3	2	2	-
CO5	-	-	-	-	-	-	-	-	2	3	1	1	1	1	-

DEPARTMENT OF BIOTECHNOLOGY

Course: B.Tech.
Course Code : KBT402

Semester: IV

Academic Year: 2021-2022
Course Name : Genetics and Molecular Biology

CO-PO & PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	3	3	-	-	-	-	-	-	-	3	1	1
CO2	1	1	1	3	3	-	-	-	-	-	-	-	1	2	1
CO3	-	1	-	-	2	-	-	-	-	-	-	-	2	1	3
CO4	-	1	-	2	2	-	-	-	-	-	-	-	2	1	2
CO5	-	1	-	2	2	-	-	-	-	-	-	-	3	3	3

DEPARTMENT OF BIOTECHNOLOGY

Course: B.Tech.
Course Code : KBT403

Semester: IV

Academic Year: 2021-2022
Course Name : Enzyme Engineering

CO-PO & PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	2	2	-	-	-	-	-	-	-	-	1	3
CO2	-	1	-	1	2	-	-	-	-	-	-	-	-	-	2
CO3	1	1	1	2	3	-	-	-	-	-	-	-	1	1	3
CO4	-	1	1	2	2	-	-	-	-	-	-	-	1	1	3
CO5	1	1	1	2	3	-	-	-	-	-	-	-	2	2	3



KASHI INSTITUTE OF TECHNOLOGY

DEPARTMENT OF BIOTECHNOLOGY

Course : B.Tech

Semester: IV

Academic Year:2021-2022

Course Code : KVE 401

Course Name : Universal

Human Value and Professional Ethics

CO-PO & PSO MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO2	PSO3
CO1	-	-	-	-	-	3	3	3	-	-	-	-	-	1	-
CO2	-	-	-	-	-	3	3	3	-	-	-	-	-	-	-
CO3	-	-	-	-	-	3	3	3	-	-	-	-	1	1	-
CO4	-	-	-	-	-	3	3	3	-	-	-	-	1	1	-
CO5	-	-	-	-	-	3	3	3	-	-	-	-	2	2	-

DEPARTMENT OF BIOTECHNOLOGY

Course: B.Tech.

Semester: IV

Academic Year:2021-2022

Course Code : KAS 404

Course Name : Mathematics-V

CO-PO & PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO 12	PS O1	PSO 2	PSO 3
CO1	-	2	-	1	2	-	-	-	-	-	-	-	-	1	3
CO2	-	2	1	3	2	-	-	-	-	-	-	-	-	-	2
CO3	2	3	2	3	3	-	-	-	-	-	-	-	1	1	3
CO4	-	2	1	2	2	-	-	-	-	-	-	-	1	1	3
CO5	1	3	1	2	3	-	-	-	-	-	-	-	2	2	3

DEPARTMENT OF BIOTECHNOLOGY

CO-PO ATTAINMENT

Course : B.Tech.

Semester: IV

Academic Year:2021-2022

Course Code : KBT401

Course Name : Bioprocess Engineering-I

CO-PO & PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	2	2	-	-	-	-	-	-	-	-	1	3
CO2	1	2	-	1	3	-	-	-	-	-	-	-	-	-	2
CO3	1	1	1	2	3	-	-	-	-	-	-	-	1	1	3
CO4	1	1	2	2	2	-	-	-	-	-	-	-	1	1	3
CO5	2	2	3	2	3	-	-	-	-	-	-	-	2	2	3

DEPARTMENT OF BIOTECHNOLOGY

Course: B.Tech.
Course Code : KVE301

Semester: IV

Academic Year:2021-2022
Course Name : Universal Human Value

CO-PO & PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	-	-	-	-	-	1	1	1	2	2	2	2	2	1	-
C02	-	-	-	-	-	-	-	1	1	3	3	2	1	2	-
C03	-	-	-	-	-	-	-	1	2	3	2	2	1	1	-
C04	-	-	-	-	-	2	1	-	1	3	2	3	2	2	-
C05	-	-	-	-	-	-	-	-	2	3	1	1	1	1	-



Attainment of Course Outcomes

In the Outcome Based Education (OBE), assessment is done through one or more than one processes, carried out by the department, that identify, collect, and prepare data to evaluate the achievement of course outcomes (CO's).

The process for finding the attainment of Course outcomes uses various tools/methods. These methods are classified into two types:

Assessment Methodology (Direct and Indirect)

Direct methods:

Direct methods display the student's knowledge and skills from their performance in the class assignment test (It is a metric used to continuously assess the student's understanding capabilities), internal assessment tests [the Internal Assessment marks in a theory paper shall be based on two tests, sessional test(mid-1) & pre university test (PUT) mid-2], End semester examinations (theory or practical), seminars, laboratory assignments/experiments (it is a qualitative performance assessment tool designed to assess student's practical knowledge and problem solving skills), mini/major projects, add on courses, certification, presentations (as per the requirement) etc. These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.

Various methods used in assessment process that periodically documents and demonstrates the degree to which the Course Outcomes are attained.

Indirect methods:

Indirect methods such as course exit survey/assignments of course outcomes by feedback, assignments of mini/major project by external experts, faculty feedback, examiner feedback & others survey to reflect on student's learning. They are used to assess opinions or thoughts about the graduate's knowledge or skills.

Collect variety of information about course outcomes from the students after learning entire course.

Rubrics are used for both formative and summative assessment of students. Same rubric is used for assessing an outcome so that the faculty is able to assess student progress and maintain the record of the same for each student.

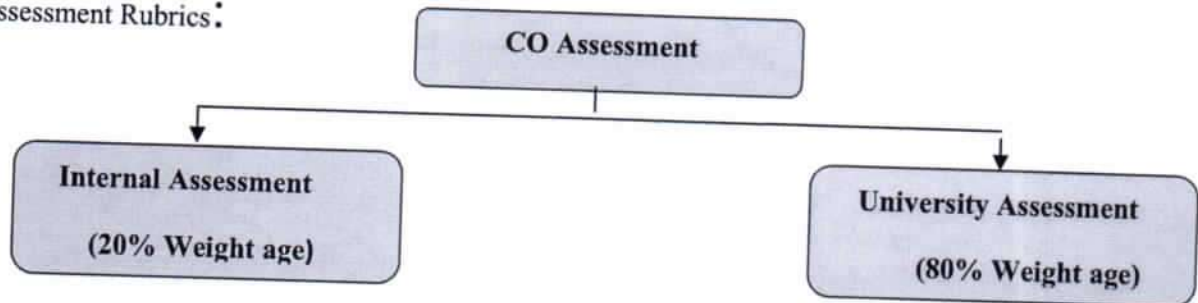


ASSESSMENT PROCESS

Assessment Process for CO Attainment:

For the evaluation and assessment of CO's and PO's, rubrics are used. The rubrics considered here are given below:

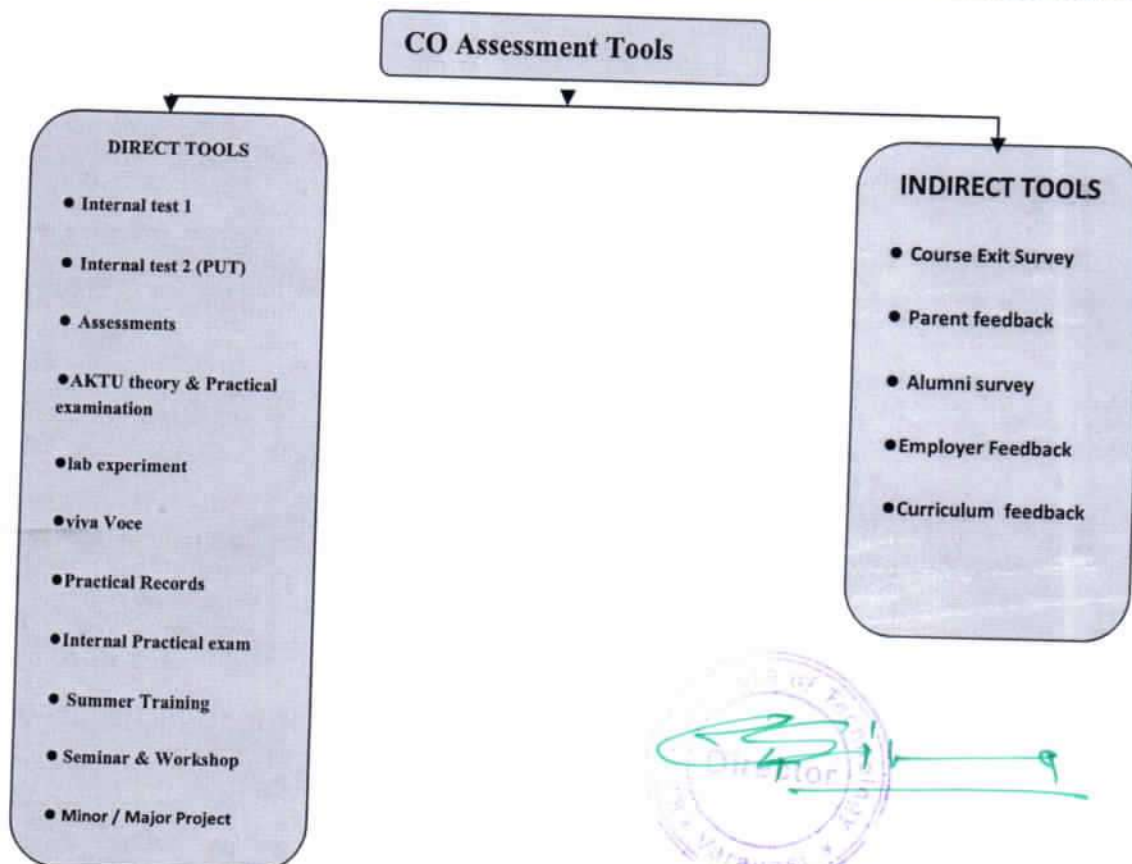
CO Assessment Rubrics:



Course Outcome is evaluated based on the performance of students in internal assessments and in university examination of a course. Internal assessment contributes 20% and university assessment contributes 80% to the total attainment of a CO.

CO Assessment Tools

The description of Assessment tools used for the evaluation of program outcomes is given in Table below. The various assessment tools used to evaluate COs and the frequency with which the assessment processes are carried out are listed in this table. In each course, the level of attainment of each CO is compared with the predefined targets, if it is not, the course coordinator takes necessary steps for the improvement to reach the target. With the help of CO against PO/PSO mapping, the PO/PSO attainment is calculated by program coordinator. Assessment Tools are of two types' direct tools and indirect tools. Which are described below?



Assessment process

Assessment Type	Assessment method	weight age	Assessment Period	Assessment and Reviewed By
Direct	Assessment tool based on Subject nature	80% (80% of AKTU Examination + 20% of the Assessment tools)	Once per Semester	Department Advisory committee
	AKTU Examination		Once per Semester	
Indirect	Current Passing out Students Survey	20%	8 th semester	Department Advisory committee
	Recruiters Survey		Every Placement activity	
	Alumni Survey		Once per Year	

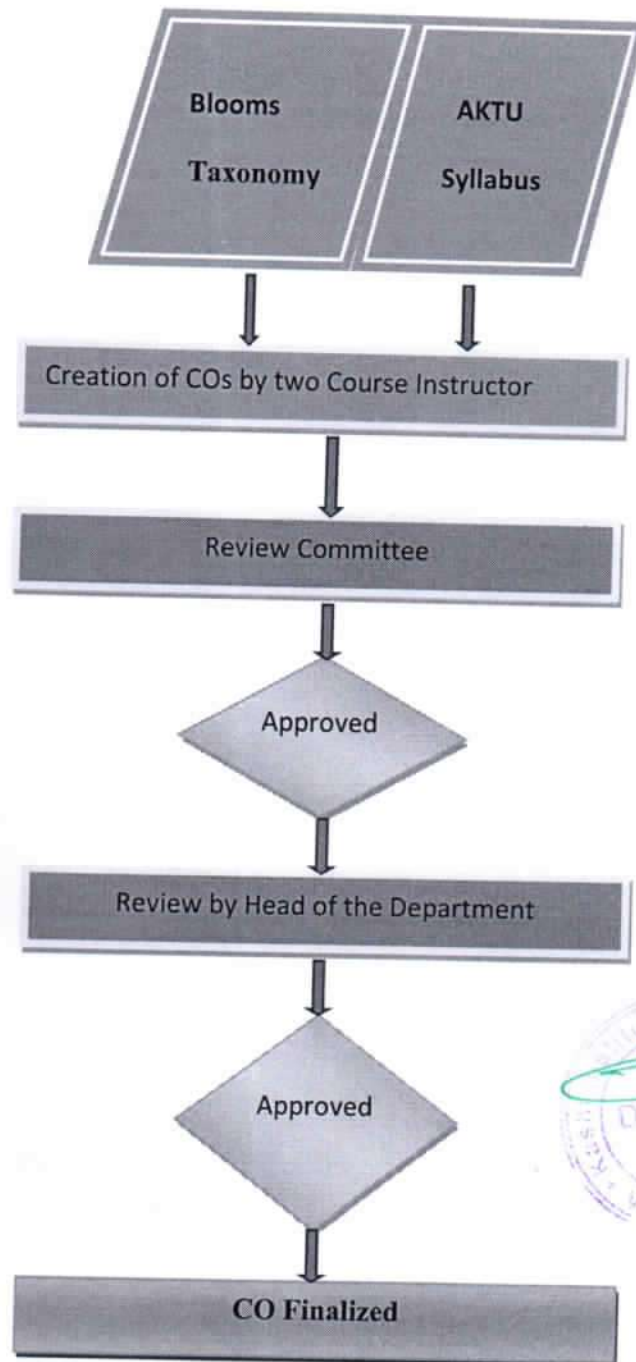
For calculating the attainment of POs and PSOs:



Assessment Process for Evaluation of Course Outcomes:

Assessment tools and its frequency, the responsible authority to collect the data and its relevant COs, are tabulated as follows:

Fig. 1



Assessment Method & Attainment Level:

Step 1: Obtain Course Outcome.

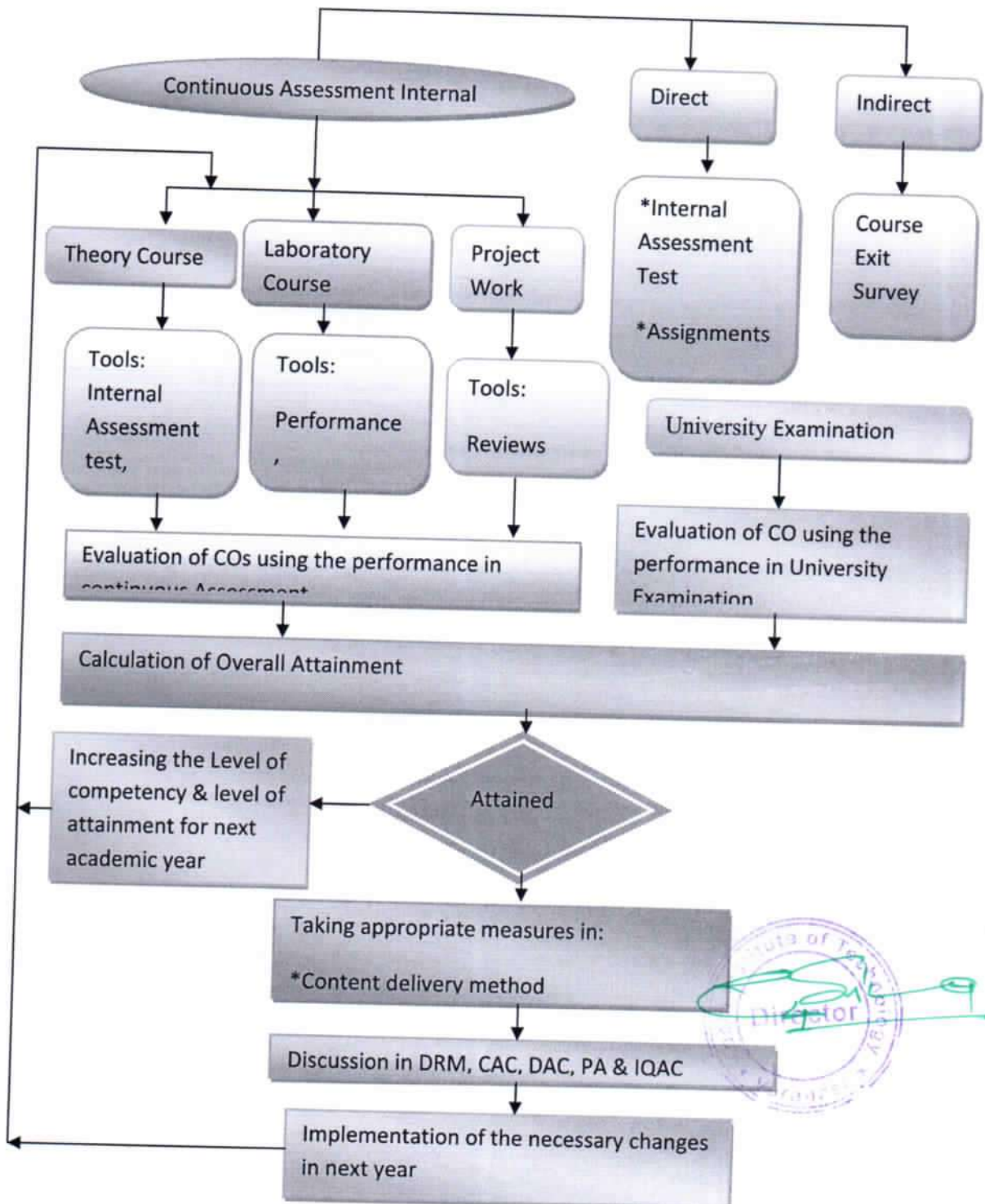
Step 2: Mapping of CO with PO.

Step 3: Setting weight- age for CO assessment.

Step 4: COs measurement through assessment.

Step 5: Obtain PO attainment table through direct and indirect method.

Process for CO Attainment: Fig.



Methodology for Evaluating Course Outcomes (COs) Internal

Concurrent Evaluation Criteria				
Pattern	Nature of Course Full / Half Credit	Concurrent Evaluation	Nature of Exam/Assignments/Others	Converted Marks
1. B. Tech Odd/Even (2021- 22)	1- Generic Core Courses (Full credit)	Internal Test 1(sessional)	Test 1 Marks- 40 (CO1 & CO2- 20 Mark each) Test 2 (PUT) Marks - 60 (CO ₃ , CO4 & CO5 - 20 Marks each)	Test 1: CO1 & CO2 (Objective) = 20 (10 marks each)
		Internal Test 2 (PUT)		Test 2 : CO3,CO4 & CO5 (Descriptive) = 30 (10 marks each)
2. MBA- Odd/Even (2021- 22)	2- Generic Elective courses (Half Credit)	Assignments (Unit wise)	Unit-1 Unit-2 Unit-3 Unit-4 Unit-5	25 (5 Marks Each)
		*Others	Seminar/Presentation/Project (Mini/Major)/Viva/Quiz/Work shop etc.	25 (5 Marks Each)
			Total Marks (Each COs)-	100

Fig .2

* Presentation / Case Study / Role Play/ Industrial Visit/Field Visit/ Seminar/Guest Lecture /MCQs/Research paper writing/ Viva etc.



Methodology for Evaluating Course Outcomes (COs) External

Score (Marks) Range	(AKTU Guidelines) Letter Grade	Level	Grade Points
≥ 90	A ⁺	Outstanding	10
<90	A	Excellent	9
$<80, \geq 70$	B ⁺	Very Good	8
$<70, \geq 60$	B	Good	7
$<60, \geq 50$	C	Above Average	6
$<50, \geq 45$	D	Average	5
$<45, \geq 40$	E	Poor	4
<40	F	Fail	00

COMPUTATION OF SGPA, YGPA & CGPA

The Dr. A.P.J. Abdul Kalam Technical University (APJAKTU), Lucknow adopts absolute grading system wherein the marks are converted to grades and every semester results will be declared with semester grade point average (SGPA). Yearly Grade Point Average (YGPA) shall be calculated at each year by calculating from the formula given in section 14.4 (b) of an academic year. The Cumulative Grade Point Average (CGPA) shall be calculated at the end of last semester of the program. The grading system is with the following letter grades and grade points scale as given below:



CO Attainment for End Semester Examination (AKTU 80%)

Course : B.Tech

Semester: III
2022

Academic Year:2021-

Course Code : KBT303

Biochemistry

Course Name :

Name of the Faculty : Mr. Shubham Yadav

S.N.	University Roll No.	NAME OF STUDENT	Internal Marks (50)	External Marks (100)	Total Marks (150)	Percentage	Grade Point Obtained
			Marks Obtained	Marks Obtained			
1	2004280540001	Alka Kumari Jha	47	29	76	50.667	C
2	2004280540002	Km. Neha Upadhyay	48	54	102	68	B
3	2004280540003	Rahat Singh	43	10	53	35.333	F
4	2004280540004	Sachin Kumar Ranjan	44	16	60	40	D
5	2004280540005	Smriti Sanjay Singh	47	11	58	38.667	F
6	2004280540006	Sneha Mishra	50	46	96	64	B

Total Number Of Student

6

Number of Students Secured More Than 70% Marks

0

% of Students Attained

0

Attainment Level

1

Gap Analysis

Achieved Attainment %	Target Attainment %	Target in Level	Attainment Level	Gap = Target in level - Attainment in level
0	Target Attainment >= 50 %	3	1	2

Action Taken Report

COs	Action Taken
CO1, CO2, CO3, CO4, CO5	Attained

Action taken for identified Gap

*Students are encouraged to Enrol NPTEL online .certification course and to appear for certification exam.
*Remedial Classes will be conducted.
*Bridge classes for units.
*Assignments for critical topic.
*Solution for university question for unit.

Rationale :

1- Since question wise students marks are not provided by affiliating university these marks are kept separate. If results are available with question wise marks COs wise analysis might have been done .

2- As we expect that each student must at least get 40% marks and he/ she may secure with pass percentage.

% of Marks Secured in a Subject / Course	Letter Grade (AKTU Guidelines)	LEVEL	Grade Points
≥ 90	A+	(Outstanding)	10
< 90	A	(Excellent)	9
< 80, ≥ 70	B+	(Very Good)	8
< 70, ≥ 60	B	(Good)	7
< 60, ≥ 50	C	(Above Average)	6
< 50, ≥ 45	D	(Average)	5
< 45, ≥ 40	E	(Poor)	0
< 40	F	(Fail)	0

Target / Threshold Level & Attainment Level			
If 60% Students Scoring ≥50% Marks	If 50% Students Scoring ≥50% Marks	If 40% Students Scoring ≥50% Marks	
Attainment Level - 3 (H)	Attainment Level - 2 (M)	Attainment Level - 1 (L)	



Direct Assessment of COs, POs & PSOs:

(Quality / Relevance of Assessment Process)

Assessment Process for Evaluation of Theory Courses

Assessment Tools and its frequency, the responsible authority to collect the data and its relevant COs, are tabulated in tables.

Assessment Tools	Assessment Period	Assessed By	Reviewed By	Mapping with COs
Class Test -1 Class Test -2 (Pre University Test) (PUT)	Once Per Semester	Course Instructor	Department Advisory committee (DAC)	Relevant CO
Assignments-1	Once Per Semester	Course Instructor	Department Advisory committee (DAC)	CO1
Assignments-2				CO2
Assignments-3				CO3
Assignments-4				CO4
Assignments-5				CO5
Quizzes	Once Per Semester	Course Instructor	Department Advisory committee (DAC)	All COs
University Semester Exam	Once Per Semester	Course Instructor	Department Advisory committee (DAC)	All COs



Assessment Tools	Assessment Period	Assessed By	Reviewed By	Mapping with COs
Lab Experiment	Throughout Semester	Course Instructor	Department Advisory committee (DAC)	All COs
Viva Voce	Throughout Semester	Course Instructor		All COs
Practical Record	Throughout Semester	Course Instructor		All COs
Internal Practical Exam	Once Per Semester	Internal Examiners		All COs
University Semester Exam	Once Per Semester	Internal Examiners appointed by the department & External Examiners Appointed by AKTU		All COs

Assessment Process for Evaluation of Laboratory Courses

Assessment Tools		Assessed Period	Assessed By	Reviewed By	Mapping with COs				
Topic Approval		7 th Sem	Project Review committee	Department Advisory committee (DAC)	All COs				
Progress Presentation 1	Presentation Skill	7 th Sem			Project Review committee	Department Advisory committee (DAC)	All COs		
	Viva Voce								
	Implementation report								
	Faculty Interaction								
Progress Presentation 2	Presentation Skill	7 th Sem					Project Review committee	Department Advisory committee (DAC)	All COs
	Viva Voce								
	Implementation report								
	Faculty Interaction								
Internal Final Presentation	Presentation Skill	8 th Sem	Internal Examiners appointed by the department & External Examiners Appointed by AKTU	Department Advisory committee (DAC)	All COs				
	Viva Voce								
	Implementation report								
	Faculty Interaction								
External Presentation	Presentation Skill	8 th Sem			Internal Examiners appointed by the department & External Examiners Appointed by AKTU	Department Advisory committee (DAC)	All COs		
	Viva Voce								
	Implementation report								
	Faculty Interaction								

Assessment Process for Evaluation of Project Courses



Assessment Process for Evaluation of Seminar Courses & Industrial Training Courses

Assessment Tools		Assessed Period	Assessed By	Reviewed By	Mapping with COs
External Presentation	Presentation Skill Viva Voce Implementation report Faculty Interaction	Once Per Semester	Seminar Review committee	Department Advisory committee (DAC)	All COs

Assessment Process for General Proficiency Course

Assessment Tools	Assessed Period	Assessed By	Reviewed By	Mapping with COs
Sports Event	Throughout the program	Sports Committee	Department Advisory Committee (DAC)	CO1
Cultural Events		Cultural Committee		CO2
Technical Events		Technical Committee		CO3
Societal & Environmental Events		Societal & Environmental Committee		CO4
Discipline		Proctorial Board		CO5

CO Attainment Target Level Methods:

There can be several methods. e.g.

- Same target is identified for all the COs of the course i.e. target can be class average marks $\geq 60\%$ marks.
- Target are same for all COs and are set in terms of performance level of different groups of students. While this method classifies students in to different categories, it does not provide any specific clues to plans for improvements of quality of learning. e.g.

Target			
(% of students getting < 50)	(% of students getting >50 and < 65)	(% of students getting >65 and < 80)	(% of students getting ≥ 80)
10	40	40	10

- Targets are set for each CO of a course separately. It does not directly indicate the distribution of performance among the students. However, it has the advantage of finding out the difficulty of specific COs. Fig.

COs	Target (Class Average)
CO1	70%
CO2	80%
CO3	75%
CO4	65%
CO5	80%

Target Level :

- Targets are quantized in to certain level, 3 being the most common number of levels.
- Level 3: If 70% students scoring $\geq 60\%$ of Marks allocated to CO
- Level 2: If 60% student scoring $\geq 60\%$ of Marks in CO
- Level 1: If 50% student scoring $\geq 60\%$ of Marks in CO
- Level 0: If < 50% student scoring $\geq 60\%$ of Marks in CO



Aim is to attain Level 3

CO Attainment Calculation:

The course outcomes for all the courses are calculated in terms of percentage using the formula.

$$\text{COx in \%} = \frac{\text{Marks obtained by the students in COx}}{\text{Maxium marks allotted in COx}} \times 100$$

Where $x = [1 \text{ to } N]$, $N = \text{Number of COs}$

Each course outcome is calculated for all the students based on marks obtained by the students.

$$\text{COx Attainment in \%} = \left[\frac{\text{No. of Students scored } \geq 70 \text{ of Marks in COx}}{\text{Total No. of students}} \times 100 \right]$$

Where $x = [1 \text{ to } N]$, $N = \text{Number of Cox}$

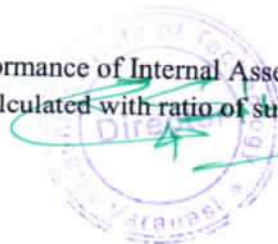
CO Attainment Level is defined based on the following criteria:

Fig.

Assessment Method	COs Attainment Level	
Internal Assessment	Level 3	If 70% students scoring $\geq 70\%$ of Marks in COs
	Level 2	If 60% student scoring $\geq 70\%$ of Marks in COs
	Level 1	If 50% student scoring $\geq 70\%$ of Marks in COs

After calculating the attainment level of each COs from the performance of Internal Assessment Test 1 & 2, the attainment level of Internal Assessment Test is calculated with ratio of sum of all

the COs attained by total number of COs as shown below:



$$\text{IAT Attainment Level} = \frac{\text{Sum of all COs attained by students}}{\text{Total Number of COs}}$$

Where IAT = Internal Assessment Test

IAT is calculated as follows:

$$\text{E.g. Internal Assessment Test} = \frac{\text{CO1} + \text{CO2} + \text{CO3} + \text{CO4} + \dots}{5}$$

Based on university grade, the attainment level of COs is calculated. The attainment level is decided on the following criteria.

Fig.

Assessment Method	Cox Attainment Level	
University (External) Assessment	Level 3	If 60% student scoring \geq 50% of Marks in University Exam
	Level 2	If 50% student scoring \geq 50% of Marks in University Exam
	Level 1	If 40% student scoring \geq 50% of Marks in University Exam

The university attainment level is calculated as follows

$$\text{Over all CO Attainment Direct} = \left(\frac{\sum_{i=1}^n \text{CO}_i}{n} \times 0.2 \right) + (\text{UA} \times 0.8)$$

(Where n = Number of course outcome)

$$\text{Over all Attainment} = \frac{(\text{DTA} + \text{UA}) + \text{IDA}}{2}$$

(Where UA = University Attainment level)

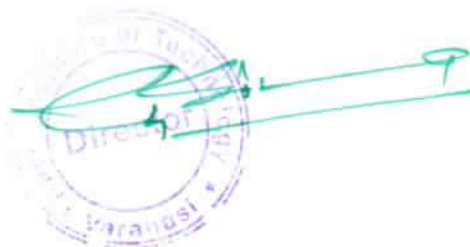
(DTA= Direct Attainment level, IDA = Indirect attainment Level)



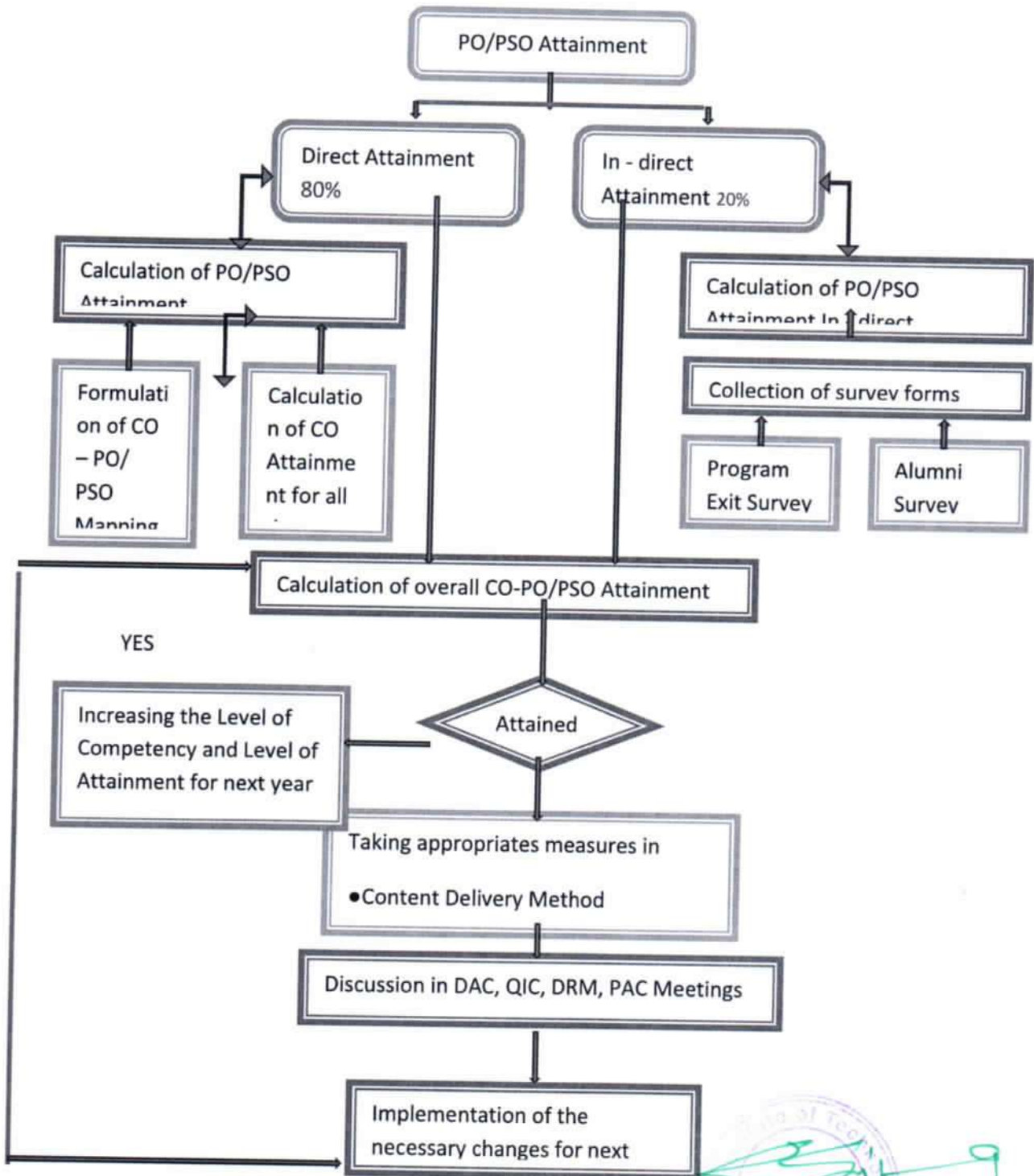
CO ATTAINMENT: SAMPLE (BIOCHEMISTRY)

DEPARTMENT OF BIOTECHNOLOGY																																																						
COURSE OUTCOMES ATTAINMENTS BASED ON DIRECT ASSESSMENT TOOLS (INTERNAL 20%)																																																						
INTERNAL TEST (IT), ASSIGNMENTS (A) & OTHER (O) (QUIZ / SEMINAR / PROJECT/ LAB EXP./WORKSHOP) MARKS																																																						
Course : B.Tech						Semester: III						Academic Year: 2021-2022						Section :																																				
Course Code : KBT 303																																																						
Name of the Faculty : Mr. Shubham Yadav																																																						
S N	Roll No.	TEST-1 (OBJECTIVE)						TEST-2 (DESCRIPTIVE)																																														
		CO1			CO2			CO3					CO4					CO5					TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL																										
		IT	A	O	IT	A	O	Original	PUT	A	O	Original	PUT	A	O	Original	PUT	A	O	Original	PUT	A	O	CO1	%	CO2	%	CO3	%	CO4	%	CO5	%																					
10	5	5	10	5	5		10	5	5		10	5	5		10	5	5		10	5	5	20		20		20		20		20																								
1	2004280540001	6	4	5	4	5	5	3	1.5	4	4	1	0.5	4	5	9	4.5	5	5	15	7.5	4	4	19	95	18	90	18	90	16.5	82.5	12	60																					
2	2004280540002	10	5	4	10	4	4	4	2	5	5	15	7.5	5	4	11	5.5	4	4	19	9.5	4	4	19	95	18	90	18	90	16.5	82.5	12	60																					
3	2004280540003	6	3	3	6	4	3	0	0	3	3	0	0	3	3	0	0	3	3	0	0	3	3	12	60	13	65	13	65	6	30	6	30																					
4	2004280540004	8	3	4	6	4	3	0	0	4	4	3	1.5	4	2	0	0	2	2	15	7.5	4	2	15	75	13	65	13	65	7.5	37.5	8	40																					
5	2004280540005	10	4	5	10	5	4	3	1.5	4	5	10	5	4	5	11	5.5	5	5	19	9.5	5	5	19	95	19	95	19	95	14	70	10.5	52.5																					
6	2004280540006	10	5	4	10	4	5	11	5.5	5	4	10	5	4	4	24	10	4	4	19	9.5	5	5	19	95	19	95	19	95	13	65	14.5	72.5																					
7																																																						
88																																																						
89																																																						
90																																																						
<table border="1"> <tr> <td>Total number of Students</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> </tr> <tr> <td>Number of Student Secured >= 70% Marks</td> <td>5</td> <td>4</td> <td>4</td> <td>2</td> <td>1</td> </tr> <tr> <td>% of Students Attained</td> <td>83</td> <td>67</td> <td>67</td> <td>33</td> <td>17</td> </tr> <tr> <td>Attainment Level</td> <td>3</td> <td>2</td> <td>2</td> <td>1</td> <td>1</td> </tr> </table>																							Total number of Students	6	6	6	6	6	Number of Student Secured >= 70% Marks	5	4	4	2	1	% of Students Attained	83	67	67	33	17	Attainment Level	3	2	2	1	1								
Total number of Students	6	6	6	6	6																																																	
Number of Student Secured >= 70% Marks	5	4	4	2	1																																																	
% of Students Attained	83	67	67	33	17																																																	
Attainment Level	3	2	2	1	1																																																	
<table border="1"> <tr> <th colspan="4">CO Attainments</th> </tr> <tr> <th>S.N.</th> <th>COs NO.</th> <th>ATM Level</th> <th>CO Attainments %</th> </tr> <tr> <td>1</td> <td>CO1</td> <td>3</td> <td>83.33</td> </tr> <tr> <td>2</td> <td>CO2</td> <td>2</td> <td>66.67</td> </tr> <tr> <td>3</td> <td>CO3</td> <td>2</td> <td>66.67</td> </tr> <tr> <td>4</td> <td>CO4</td> <td>1</td> <td>33.33</td> </tr> <tr> <td>5</td> <td>CO5</td> <td>1</td> <td>16.67</td> </tr> <tr> <td colspan="2">AVG</td> <td>1.80</td> <td>53.33</td> </tr> </table>																							CO Attainments				S.N.	COs NO.	ATM Level	CO Attainments %	1	CO1	3	83.33	2	CO2	2	66.67	3	CO3	2	66.67	4	CO4	1	33.33	5	CO5	1	16.67	AVG		1.80	53.33
CO Attainments																																																						
S.N.	COs NO.	ATM Level	CO Attainments %																																																			
1	CO1	3	83.33																																																			
2	CO2	2	66.67																																																			
3	CO3	2	66.67																																																			
4	CO4	1	33.33																																																			
5	CO5	1	16.67																																																			
AVG		1.80	53.33																																																			
<p>If 70% Students Scoring >=70% Marks</p> <p>ATTAINMENT LEVEL 3</p> <p>If 60% Students Scoring >=70% Marks</p> <p>ATTAINMENT LEVEL 2</p> <p>If 50% Students Scoring >=70% Marks</p> <p>ATTAINMENT LEVEL 1</p>						Signature of faculty																																																

Result: Over all Attainment level 1.80



Process for PO/PSO Attainment: Fig:

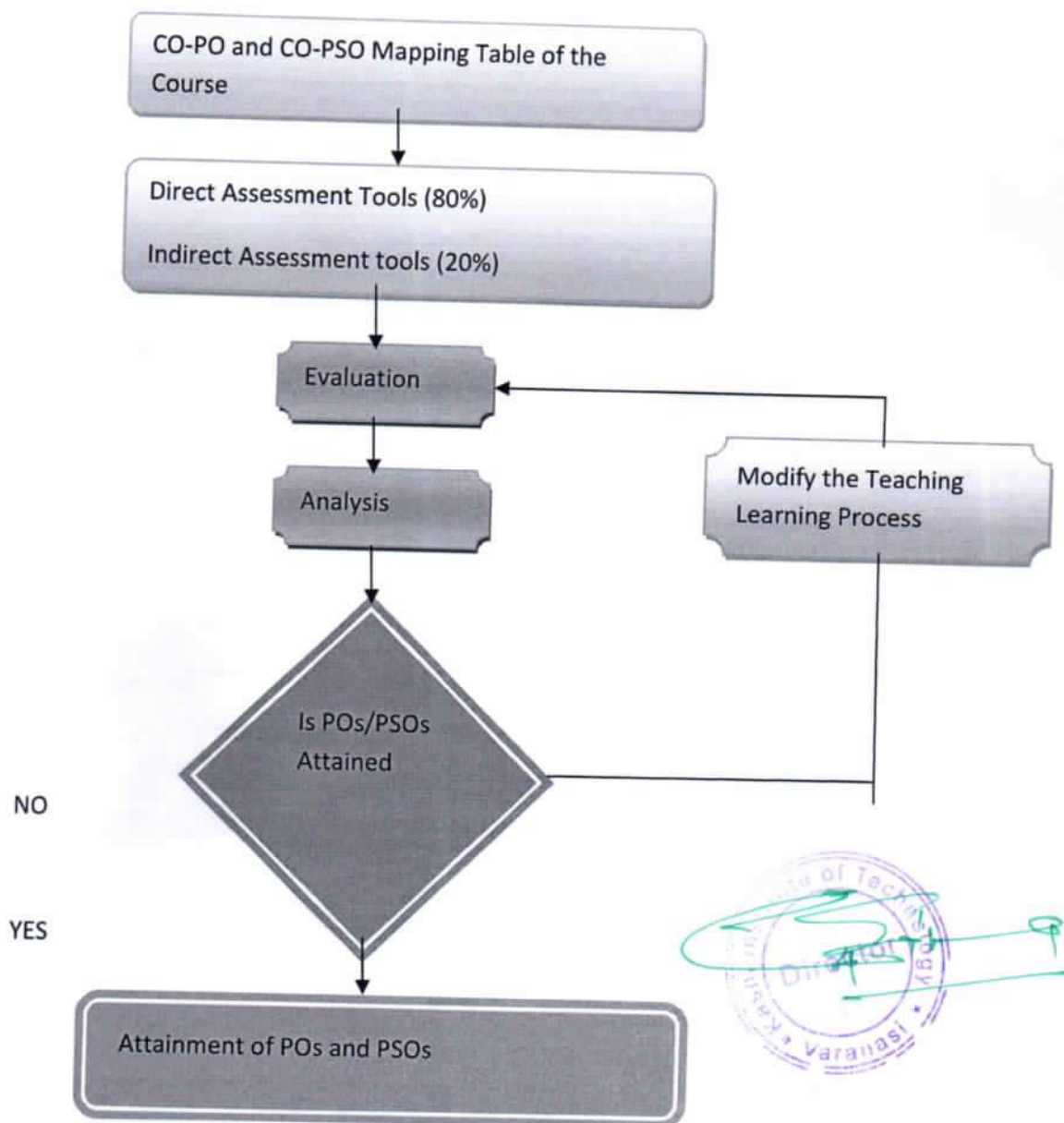


Director
 Varanasi

Assessment tools and processes used for measuring the Attainment of each of the Program Outcomes (POs) and Program Specific Outcomes (PSOs):

Evaluation of attainment of POs and PSOs is based on direct and indirect assessment tools. Direct assessment of POs and PSOs is based on student's performance in continuous assessment and university examination. Indirect assessment is based on Program Exit Survey (Theory & Practical). The various direct and indirect tools and its frequency, the responsible authority to collect data for assessing the attainment of each POs and PSOs are given below table.

Fig.



Course level PO & PSO Attainment Calculation:

The PO & PSO attainment for the course is calculated using following formula

PO Attainment of Course (X)

$$= \text{CO Attainment \% of Course } (X) \times \text{PO}_y \text{ mapping value of course}(x)/100$$

PO Attainment Level of Course (X)

$$= (\text{weighted Average Value of PO} \times \text{CO Attainment Average}) / 3$$

PSO Attainment of Course (X)

$$= \text{CO Attainment \% of Course } (X) \times \text{PSO}_y \text{ mapping value of course}(x)/100$$

(Where, $y = [1 \text{ to } N]$, $N = \text{Number of Program Outcomes}$)

PSO Attainment Level of Course (X)

$$= (\text{weighted Average Value of PSO} \times \text{CO Attainment Average}) / 3$$

(Where, $y = [1 \text{ to } N]$, $N = \text{Number of Program Specific Outcomes}$)



PO & PSO ATTAINMENT

KASHI INSTITUTE OF TECHNOLOGY																															
DEPARTMENT OF BIOTECHNOLOGY																															
CO-PO ATTAINMENT																															
Course : B.Tech							Semester: III							Academic Year:2021-2022																	
Course Code : KBT503														Course Name : Biochemistry																	
Name of the Faculty : Mr. Shubham Yadav																															
CO-PO & PSO MAPPING																															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3																
CO1	-	1	-	2	2	-	-	-	-	-	-	-	-	-	1	3															
CO2	-	1	-	1	2	-	-	-	-	-	-	-	-	-	-	-	2														
CO3	1	1	1	2	3	-	-	-	-	-	-	-	-	-	1	1	3														
CO4	-	1	1	2	2	-	-	-	-	-	-	-	-	-	1	1	3														
CO5	1	1	1	2	3	-	-	-	-	-	-	-	-	-	2	2	3														
CO- PO & PSO COMPUTATION																															
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3	
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A
CO1	83.33	-	-	1	0.83	-	-	2	1.67	2	1.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.83	3	2.5	
CO2	66.67	-	-	1	0.67	-	-	1	0.67	2	1.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.83	3	2
CO3	66.67	1	0.7	1	0.67	1	0.7	2	1.33	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1.333	
CO4	33.33	-	-	1	0.33	1	0.3	2	0.67	2	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.67	1	0.67	3	2
CO5	16.67	1	0.2	1	0.17	1	0.2	2	0.33	3	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.33	1	0.33	3	1
TOTAL		2	0.8	5	2.67	3	1.2	9	4.67	12	6.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1.33	5	2.17	14	7.333
Attainment %		42		53.3		39		51.9		51.4		###		###		###		###		###		###		###		33.3		43.3		52.38	
Attained Level		2		2		2		2		2		###		###		###		###		###		###		###		2		2		2	
WEIGHTED AVERAGE VALUE OF POs/PSOs		0.42		0.53		0.39		0.93		1.23		###		###		###		###		###		###		###		0.44		0.54		1.47	

KASHI INSTITUTE OF TECHNOLOGY																																
DEPARTMENT OF BIOTECHNOLOGY																																
CO-PO ATTAINMENT																																
Course : B.Tech							Semester: IV							Academic Year:2021-2022																		
Course Code : KBT401														Course Name : Bioprocess Engineering-I																		
Name of the Faculty : Dr. Souu Kumar																																
Section : NA																																
CO-PO & PSO MAPPING																																
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3																	
CO1	3	1	2	2	2	-	-	-	-	-	-	-	-	-	1	3																
CO2	1	2	-	1	3	-	-	-	-	-	-	-	-	-	-	-	2															
CO3	1	1	1	2	3	-	-	-	-	-	-	-	-	-	1	1	3															
CO4	1	1	2	2	2	-	-	-	-	-	-	-	-	-	1	1	3															
CO5	2	2	3	2	3	-	-	-	-	-	-	-	-	-	2	2	3															
CO- PO & PSO COMPUTATION																																
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3		
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	
CO1	66.67	3	2	1	0.67	2	1.3	2	1.33	2	1.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.67	3	2		
CO2	83.33	1	0.8	2	1.67	-	-	1	0.83	3	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1.667		
CO3	50.00	1	0.5	1	0.5	1	0.5	2	1	3	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.5	3	1.5
CO4	50.00	1	0.5	1	0.5	2	1	2	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.5	1	0.5	3	1.5	
CO5	50.00	2	1	2	1	3	1.5	2	1	3	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	2	1	3	1.5	
TOTAL		8	4.8	7	4.33	8	4.3	9	5.17	13	7.83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	2	5	2.67	14	8.167	
Attainment %		60		61.9		54		57.4		60.3		###		###		###		###		###		###		###		50		53.3		58.33		
Attained Level		2		2		2		2		2		###		###		###		###		###		###		###		2		2		2		
WEIGHTED AVERAGE VALUE OF POs/PSOs		0.97		0.87		1.08		1.03		1.57		###		###		###		###		###		###		###		0.67		0.67		1.63		

Director

KASHI INSTITUTE OF TECHNOLOGY																																					
DEPARTMENT OF BIOTECHNOLOGY																																					
CO-PO ATTAINMENT																																					
Course : B.Tech				Semester: IV				Academic Year: 2021-2022																													
Course Code : KBT403								Course Name : Enzyme Engineering																													
Name of the Faculty : Mr. Subham Yadav								Section :																													
CO-PO & PSO MAPPING																																					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3																						
CO1	-	1	-	2	2	-	-	-	-	-	-	-	-	1	3																						
CO2	-	1	-	1	2	-	-	-	-	-	-	-	-	-	2																						
CO3	1	1	1	2	3	-	-	-	-	-	-	-	1	1	3																						
CO4	-	1	1	2	2	-	-	-	-	-	-	-	1	1	3																						
CO5	1	1	1	2	3	-	-	-	-	-	-	-	2	2	3																						
CO- PO & PSO COMPUTATION																																					
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3							
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A						
CO1	83.33	-	-	1	0.83	-	-	2	1.67	2	1.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.83	3	2.5							
CO2	100.00	-	-	1	1	-	-	1	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
CO3	16.67	1	0.2	1	0.17	1	0.2	2	0.33	3	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.17	1	0.17	3	0.5						
CO4	33.33	-	-	1	0.33	1	0.3	2	0.67	2	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.33	1	0.33	3	1							
CO5	16.67	1	0.2	1	0.17	1	0.2	2	0.33	3	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.17	1	0.17	3	1							
TOTAL		2	0.3	5	2.5	3	0.7	9	4	12	5.33	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.33	2	0.33	3	0.5							
Attainment %		17		50		22		44.4		44.4		####		####		####		####		####		####		####		4		0.83		5		1.67		14		6.5	
Attained Level		2		2		2		2		2		####		####		####		####		####		####		####		2		2		2		2		2			
WEIGHTED AVERAGE VALUE OF POs/PSOs		0.17		0.50		0.22		0.80		1.07		####		####		####		####		####		####		####		2		0.28		0.42		1.30		1.30			

KASHI INSTITUTE OF TECHNOLOGY																																			
DEPARTMENT OF MECHANICAL ENGINEERING																																			
CO-PO ATTAINMENT																																			
Course : B.Tech				Semester: 3				Academic Year: 2021-2022																											
Course Code : KOE303								Course Name : ESE																											
Name of the Faculty : Dr. Kumar Sonu																																			
CO-PO & PSO MAPPING																																			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3																				
CO1	2	1	2	2	-	-	-	-	-	-	-	-	3	1	-																				
CO2	2	-	-	-	-	-	-	-	-	-	-	-	3	1	-																				
CO3	2	-	1	-	-	-	-	-	-	-	-	-	1	-	-																				
CO4	1	1	1	-	-	-	-	-	-	-	-	-	1	-	-																				
CO5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-																				
CO- PO & PSO COMPUTATION																																			
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3					
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A						
CO1	100.00	2	2	1	1	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	1	1	-	-				
CO2	83.33	2	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2.5	1	0.8333	-	-					
CO3	16.67	2	0.3	-	-	1	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.17	0	0	-	-					
CO4	66.67	1	0.7	1	0.67	1	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.17	0	0	-	-					
CO5	33.33	2	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.6667	-	-	-	-					
TOTAL		9	5.3	2	1.67	4	2.8	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	5.67	3	2.5	-	-					
Attainment %		59		83.3		71		100		####		####		####		####		####		####		####		####		7		5.67		3		2.5		-	
Attained Level		2		3		2		3		####		####		####		####		####		####		####		####		81		83.333		####		####		####	
WEIGHTED AVERAGE VALUE OF POs/PSOs		1.07		0.83		0.94		2.00		####		####		####		####		####		####		####		####		1.89		0.63		####		####		####	

Director
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CO-PO & PSO MAPPING															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	3	3	-	-	-	-	-	-	-	3	1	1
CO2	1	1	1	3	3	-	-	-	-	-	-	-	1	2	1
CO3	-	1	-	0	2	-	-	-	-	-	-	-	2	1	3
CO4	-	1	-	2	2	-	-	-	-	-	-	-	2	1	2
CO5	-	1	-	2	2	-	-	-	-	-	-	-	3	3	3

CO- PO & PSO COMPUTATION																																	
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3			
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A		
CO1	66.67	1	0.7	1	0.67	1	0.7	3	2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	1	0.67	1	0.6667	
CO2	66.67	1	0.7	1	0.67	1	0.7	3	2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.67	2	1.33	1	0.6667	
CO3	50.00	-	-	1	0.5	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	0.5	3	1.5	
CO4	50.00	-	-	1	0.5	-	-	2	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	0.5	2	1		
CO5	33.33	-	-	1	0.33	-	-	2	0.67	2	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	3	1	3	1		
TOTAL		2	1.3	5	2.67	2	1.3	10	5.67	12	6.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	3	1	3	1		
Attainment %		67		53.3		67		56.7		55.6		#		#		#		#		#		#		#		#		#		#		#	
Attained Level		2		2		2		2		2		#		#		#		#		#		#		#		#		#		#		#	
WEIGHTED AVERAGE VALUE OF POs/PSOs		0.67		0.53		0.67		1.42		1.33		#		#		#		#		#		#		#		#		#		#		#	

KASHI INSTITUTE OF TECHNOLOGY
 DEPARTMENT OF BIOTECHNOLOGY
CO-PO ATTAINMENT
 Course : B.Tech Semester: III Academic Year:2021-2022
 Course Code : KBT302 Course Name : Microbiology and Immunology
 Name of the Faculty : Mr. Shrikham Yadav Section :

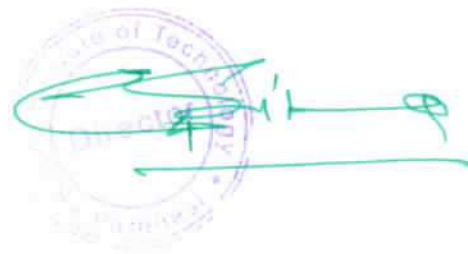
CO-PO & PSO MAPPING															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	2	2	-	-	-	-	-	-	-	-	1	3
CO2	-	1	-	1	2	-	-	-	-	-	-	-	-	-	2
CO3	1	1	1	2	3	-	-	-	-	-	-	-	1	1	3
CO4	-	1	1	2	2	-	-	-	-	-	-	-	1	1	3
CO5	1	1	1	2	3	-	-	-	-	-	-	-	2	2	3

CO- PO & PSO COMPUTATION																																	
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3			
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A				
CO1	66.67	-	-	1	0.67	-	-	2	1.33	2	1.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.67	3	2			
CO2	66.67	-	-	1	0.67	-	-	1	0.67	2	1.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1.33333			
CO3	50.00	1	0.5	1	0.5	1	0.5	2	1	3	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.5	1	0.5	3	1.5		
CO4	0.00	-	-	1	-	1	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	3	-		
CO5	33.33	1	0.3	1	0.33	1	0.3	2	0.67	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.67	2	0.67	3	1		
TOTAL		2	0.8	5	2.17	3	0.8	9	3.67	12	5.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1.17	5	1.83	14	5.83333		
Attainment %		42		43.3		28		40.7		43.1		#		#		#		#		#		#		#		#		#		#		#	
Attained Level		2		2		2		2		2		#		#		#		#		#		#		#		#		#		#		#	
WEIGHTED AVERAGE VALUE OF POs/PSOs		0.42		0.54		0.42		0.92		1.29		#		#		#		#		#		#		#		#		#		#		#	



KASHI INSTITUTE OF TECHNOLOGY																															
DEPARTMENT OF BIOTECHNOLOGY																															
CO-PO ATTAINMENT																															
Course : B.Tech				Semester: III				Academic Year:2021-2022																							
Course Code : KBT 301				Course Name : Techniques in Biotechnology																											
Name of the Faculty : Mr. Shubham Yadav				Section :																											
CO-PO & PSO MAPPING																															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3																
CO1	2	1	2	1	2	-	-	-	-	-	-	-	1	1	2																
CO2	1	1	1	1	2	1	1	1	1	1	1	1	3	1	3																
CO3	1	1	1	1	1	-	-	-	-	-	-	-	3	3	2																
CO4	-	1	-	1	1	-	-	-	-	-	-	-	1	1	2																
CO5	1	1	1	2	2	-	-	-	-	-	-	-	3	2	1																
CO- PO & PSO COMPUTATION																															
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3	
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A
CO1	83.33	2	1.7	1	0.83	2	1.7	1	0.83	2	1.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.83	1	0.83	2	1.67
CO2	100.00	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	3	3
CO3	33.33	1	0.3	1	0.33	1	0.3	1	0.33	1	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.67	1	0.67	2	1.33
CO4	66.67	-	-	1	0.67	-	-	1	0.67	1	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.67	1	0.67	2	1.33
CO5	33.33	1	0.3	1	0.33	1	0.3	2	0.67	2	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	2	0.67	1	0.33
TOTAL		5	3.3	5	3.17	5	3.3	6	3.5	8	5.33	1	1	1	1	1	1	1	1	1	1	1	1	1	11	6.5	8	4.17	10	7	
Attainment %		67		63.3		67		58.3		66.7		100		100		100		100		100		100		100		59.1		52.1		70	
Attained Level		2		2		2		2		2		3		3		3		3		3		3		3		2		2		2	
WEIGHTED AVERAGE VALUE OF POs/PSOs		0.83		0.63		0.83		0.70		1.07		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.30		0.83		1.40	
P = PLANNED		A = ATTAINED																													

KASHI INSTITUTE OF TECHNOLOGY																															
DEPARTMENT OF BIOTECHNOLOGY																															
CO-PO ATTAINMENT																															
Course : B.Tech				Semester: 3RD				Academic Year:2021-2022																							
Course Code : KAS 301				Course Name : Technical Communication																											
CO-PO & PSO MAPPING																															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3																
CO1	-	-	-	-	1	1	1	2	2	2	2	2	2	1	-																
CO2	-	-	-	-	-	-	1	1	3	3	2	2	1	2	-																
CO3	-	-	-	-	-	-	1	2	3	2	2	2	1	1	-																
CO4	-	-	-	-	2	1	-	1	3	2	3	2	2	2	-																
CO5	-	-	-	-	-	-	-	2	3	1	1	1	1	1	-																
CO- PO & PSO COMPUTATION																															
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3	
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A
CO1	83.33	-	-	-	-	-	-	-	-	-	-	1	0.83	1	0.83	1	0.83	2	1.67	2	1.7	2	1.67	2	1.67	2	1.67	1	0.83	-	-
CO2	66.67	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.67	1	0.67	3	2	3	2	2	1.33	1	0.67	2	1.33	-	-	
CO3	66.67	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.67	2	1.33	3	2	2	1.33	2	1.33	1	0.67	1	0.67	-	-	
CO4	66.67	-	-	-	-	-	-	-	-	-	-	2	1.33	1	0.67	-	-	1	0.67	3	2	2	1.33	3	2	2	1.33	2	1.33	-	-
CO5	16.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.33	3	0.5	1	0.17	1	0.17	1	0.17	1	0.17	-	-	
TOTAL		-	-	-	-	-	-	-	-	-	-	3	2.17	2	1.5	3	2.17	8	4.67	14	8.2	10	6.5	10	6.5	7	4.5	7	4.33	-	-
Attainment %		###		###		###		###		###		72.2		75		72.2		58.3		58		65		65		64.3		61.9		###	
Attained Level		###		###		###		###		###		3		3		3		2		2		2		2		2		2		###	
WEIGHTED AVERAGE VALUE OF POs/PSOs		###		###		###		###		###		1.08		0.75		0.72		0.93		1.63		1.30		1.30		0.90		0.87		###	



KASHI INSTITUTE OF TECHNOLOGY																															
DEPARTMENT OF BIOTECHNOLOGY																															
CO-PO ATTAINMENT																															
Course : B.Tech				Semester: IV				Academic Year:2021-2022																							
Course Code : KAS 404				Course Name : Mathematics-V																											
Name of the Faculty : Mr. Anil Yadav																															
CO-PO & PSO MAPPING																															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3																
CO1	-	2	-	1	2	-	-	-	-	-	-	-	-	1	3																
CO2	-	2	1	3	2	-	-	-	-	-	-	-	-	-	2																
CO3	2	3	2	3	3	-	-	-	-	-	-	-	1	1	3																
CO4	-	2	1	2	2	-	-	-	-	-	-	-	1	1	3																
CO5	1	3	1	2	3	-	-	-	-	-	-	-	2	2	3																
CO- PO & PSO COMPUTATION																															
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3	
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A
CO1	50.00	-	-	2	1	-	-	1	0.5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.5	3	1.5	
CO2	50.00	-	-	2	1	1	0.5	3	1.5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.5	1	0.5	3	1.5
CO3	50.00	2	1	3	1.5	2	1	3	1.5	3	1.5	3	1.5	-	-	-	-	-	-	-	-	-	-	-	-	1	0.17	1	0.17	3	0.5
CO4	16.67	-	-	2	0.33	1	0.2	2	0.33	2	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.17	1	0.17	3	0.5	
CO5	33.33	1	0.3	3	1	1	0.3	2	0.67	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.67	2	0.67	3	1	
TOTAL		3	1.3	12	4.83	5	2	11	4.5	12	4.83	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1.33	5	1.83	14	5.5	
Attainment %		44		40.3		40		40.9		40.3																33.3		36.7		39	
Attained Level		2		2		2		2		2																2		2		2	
WEIGHTED AVERAGE VALUE OF POs/PSOs		0.67		0.97		0.50		0.90		0.97																0.44		0.46		###	

KASHI INSTITUTE OF TECHNOLOGY																																
DEPARTMENT OF BIOTECHNOLOGY																																
CO-PO ATTAINMENT																																
Course : B.Tech				Semester: III				Academic Year:2021-2022																								
Course Code : KBT 301				Course Name : Techniques in Biotechnology																												
Name of the Faculty : Mr. Shubham Yadav																																
CO-PO & PSO MAPPING																																
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3																	
CO1	2	1	2	1	2	-	-	-	-	-	-	-	1	1	2																	
CO2	1	1	1	1	2	1	1	1	1	1	1	1	3	1	3																	
CO3	1	1	1	1	1	-	-	-	-	-	-	-	3	3	2																	
CO4	-	1	-	1	1	-	-	-	-	-	-	-	1	1	2																	
CO5	1	1	1	2	2	-	-	-	-	-	-	-	3	2	1																	
CO- PO & PSO COMPUTATION																																
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3		
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	
CO1	83.33	2	1.7	1	0.83	2	1.7	1	0.83	2	1.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.83	1	0.83	2	1.67	
CO2	100.00	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	3	3	
CO3	33.33	1	0.3	1	0.33	1	0.3	1	0.33	1	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	3	1	2	0.67	
CO4	66.67	-	-	1	0.67	-	-	1	0.67	1	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	2	0.67	1	0.33	
CO5	33.33	1	0.3	1	0.33	1	0.3	2	0.67	2	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	11	6.5	8	4.17	10	7
TOTAL		5	3.3	5	3.17	5	3.3	6	3.5	8	5.33	1	1	1	1	1	1	1	1	1	1	1	1	1	11	59.1		52.1		70		
Attainment %		67		63.3		67		58.3		66.7																2		2		2		
Attained Level		2		2		2		2		2		3		3		3		3		3		3		3		2		2		2		
WEIGHTED AVERAGE VALUE OF POs/PSOs		0.83		0.63		0.83		0.70		1.07		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.30		0.83		1.40		

Director
 Kashi Institute of Technology
 Varanasi

KASHI INSTITUTE OF TECHNOLOGY																
DEPARTMENT OF BIOTECHNOLOGY																
Course : B.Tech			Semester: IV			Academic Year:2021-2022										
Course Code : KYE 401			Course Name : Universal Human Value and Professional Ethics													
Name of the Faculty : Mr. Anurish Tiwari																
CO-PO & PSO MAPPING																
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	-	-	-	-	-	3	3	3	-	-	-	-	-	1	-	
CO2	-	-	-	-	-	3	3	3	-	-	-	-	-	-	-	
CO3	-	-	-	-	-	3	3	3	-	-	-	-	1	1	-	
CO4	-	-	-	-	-	3	3	3	-	-	-	-	1	1	-	
CO5	-	-	-	-	-	3	3	3	-	-	-	-	2	2	-	

CO- PO & PSO COMPUTATION																																		
COs	CO Attainment %	PO1		PO2		PO3		PO4		PO5		PO6		PO7		PO8		PO9		PO10		PO11		PO12		PSO1		PSO2		PSO3				
		P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A			
CO1	66.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	66.67	-	-	-	-	-	-	-	-	-	-	-	3	2	3	2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	33.33	-	-	-	-	-	-	-	-	-	-	-	3	1	3	1	3	1	-	-	-	-	-	-	-	-	1	0.33	1	0.33	-	-	-	-
CO4	16.67	-	-	-	-	-	-	-	-	-	-	-	3	0.5	3	0.5	3	0.5	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	
CO5	0.00	-	-	-	-	-	-	-	-	-	-	-	3	0.5	3	0	3	0	-	-	-	-	-	-	-	-	2	0	2	0	-	-	-	
TOTAL		-	-	-	-	-	-	-	-	-	-	15	6	15	5.5	15	5.5	-	-	-	-	-	-	-	-	4	0.33	5	1	0	-	-	-	
Attainment %		-	-	-	-	-	-	-	-	-	-	-	40	36.7	36.7	-	-	-	-	-	-	-	-	-	-	8.33	20	20	-	-	-	-		
Attained Level		-	-	-	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-		
WEIGHTED AVERAGE VALUE OF POs/PSOs		-	-	-	-	-	-	-	-	-	-	-	1.20	1.10	1.10	####	###	####	####	####	####	####	####	####	####	0.17	0.33	0.33	-	-	-	-	-	
P = PLANNED		A = ATTAINED																																

CO Attainments			
S.N.	COs NO.	CO Percentage	CO ATM Level
1	CO1	66.67	2
2	CO2	66.67	2
3	CO3	33.33	1
4	CO4	16.67	1
5	CO5	0.00	1

Action Taken Report	
COs	Action Taken
CO1	Attained
CO2	Attained
CO3	Attained
CO4	Attained
CO5	Attained

Head of the Department
Biotechnology



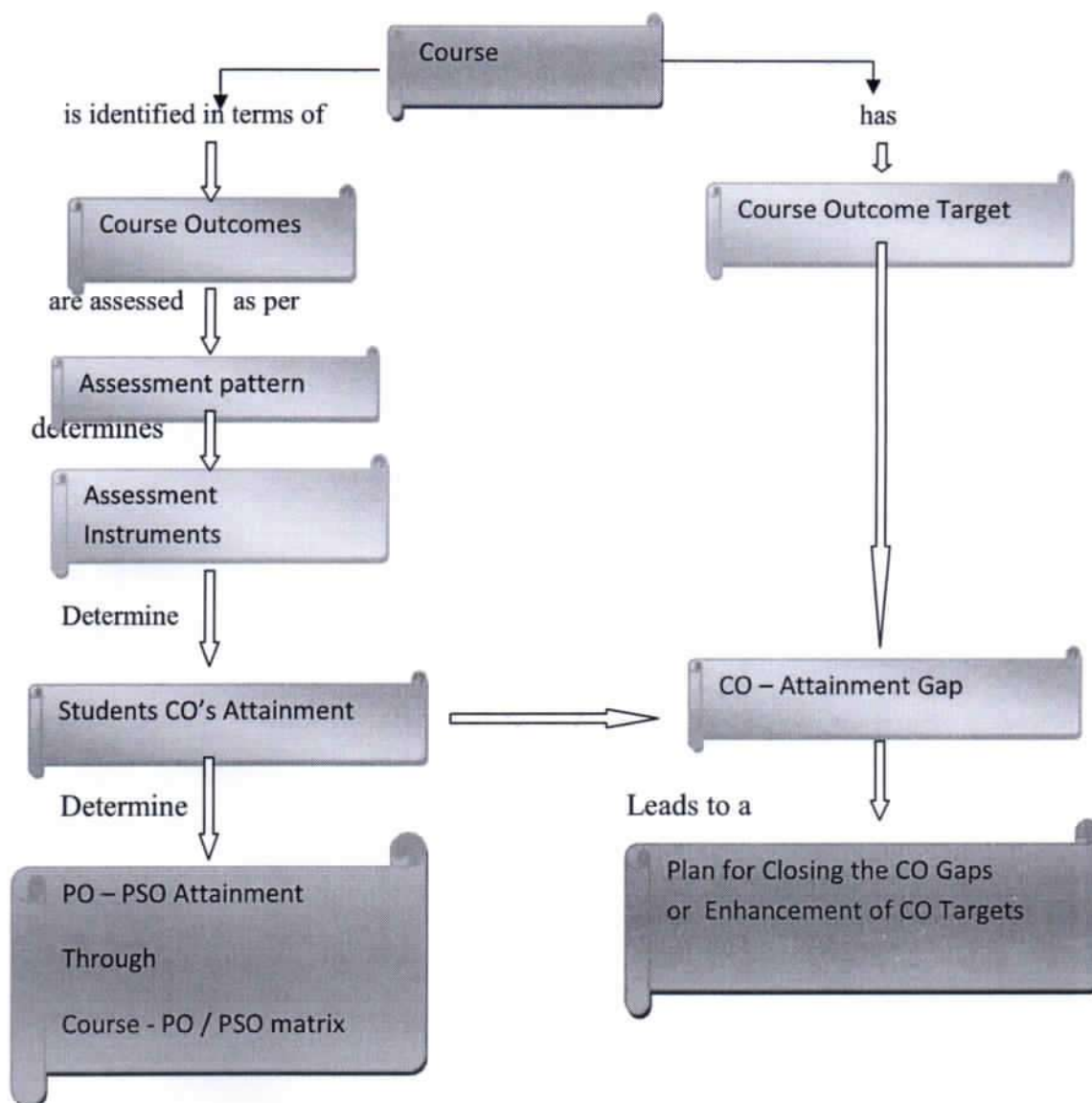
INDIRECT ATTAINMENT:

KASHI INSTITUTE OF TECHNOLOGY				
DEPARTMENT OF BIOTECHNOLOGY				
INDIRECT ATTAINMENT				
Course : B.Tech		Semester: III		Academic Year:2021-2022
Course Code : KBT303		Course Name : Biochemistry		
Name of the Faculty : Mr. Shubham Yadav				
S.No	Roll No.	Name	MM (20)	Percentage
1	2004280540001	Alka Kumari Jha	15	75
2	2004280540002	Km. Neha Upadhyay	13	65
3	2004280540003	Rahat Singh	14	70
4	2004280540004	Sachin Kumar Ranjan	14	70
5	2004280540005	Smriti Sanjay Singh	16	80
6	2004280540006	Sneha Mishra	15	75
Total number of Students				6
Number of Student Secured \geq 70% Marks				5
% of Students Attained				83
Attainment Level				3
Action Taken Report				
COs		Action Taken		
CO1, CO2, CO3, CO4, CO5		Attained		
Head of the Department Biotechnology				



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CO attainment and Gap Analysis:



Calculation of Gap Analysis:

$$\text{Gap} = \text{Target in level} - \text{Attainment in level}$$



KASHI INSTITUTE OF TECHNOLOGY				
DEPARTMENT OF BIOTECHNOLOGY				
OVERALL ATTAINMENT				
Course : B.Tech		Semester: III	Academic Year:2021-2022	
Course Code : KBT303		Course Name : Biochemistry		
Name of the Faculty : Mr. Shubham Yadav				
DIRECT ATM LEVEL	AKTU END SEM ATM LEVEL	DT*0.2+AE*0.8	Indirect ATM Level	OVERALL ATM LEVEL
2	1	1.16	3	2.08
OVERALL ATM AVG. =		2.08		
Sign of Faculty			Head of the Department Biotechnology	

Action taken after identifying the gaps:

Convey the identified gaps to Board of Studies:

Considering the feedback from faculty, PAC committee, students and DAB committee, a representation is prepared by the department to convey the gaps and possible action plan to the Board of Studies (BOS). These inputs are taken into consideration by BOS while revising the syllabus

Following activities are planned to fulfil the identified gap.

Action taken for identified Gap
*Students are encouraged to Enrol NPTEL online certification course and to appear for certification exam.
*Remedial Classes will be conducted.
*Bridge classes for units.
*Assignments for critical topic.
*Solution for university question for unit.

