



MYSORE DIOCESAN EDUCATIONAL SOCIETY (Regd.,)

**ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSORE
AFFILIATED WITH THE UNIVERSITY OF MYSORE
REACCREDITED BY NAAC WITH B++ GRADE**

**GUIDELINES TO DESIGN THE OUTCOME-BASED EDUCATIONAL (OBE)
FRAME WORK**

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FORWARD

As educators, our primary aim is to equip students with the knowledge, skills, and competencies necessary for success in an ever-changing world. Traditional educational approaches often prioritize content delivery over ensuring students' comprehensive understanding and practical application of concepts. However, Outcome-Based Education challenges this norm by prioritizing clearly defined learning outcomes and assessment methods that authentically gauge student achievement.

Within the pages of this manual, you will explore the foundational principles of Outcome-Based Education, emphasizing the critical importance of articulating precise learning objectives, crafting assessments that align with these objectives, and cultivating a student-centric learning atmosphere conducive to active participation and profound comprehension.

This manual comprehensively covers various aspects of Outcome-Based Education, ranging from curriculum design and lesson planning to assessment creation and feedback mechanisms. It provides valuable insights, practical examples, and actionable steps to aid you in your pursuit of more effective and impactful teaching strategies.

We acknowledge that education is a dynamic field, continually evolving to meet the evolving needs of students. Embracing Outcome-Based Education enables us to adapt and innovate, ensuring that our instructional approaches remain pertinent, responsive, and transformative.

We extend our sincere gratitude to all faculty members of the post-graduate studies and research center of the College for their enthusiastic collaboration in bringing this manual to fruition. We have diligently addressed all sources, both known and unknown, used in the development of this Outcome-Based Education manual, and we kindly request your acknowledgment of this effort

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GUIDELINES TO DESIGN THE OUTCOME-BASED EDUCATIONAL (OBE) FRAME WORK

1.0 PREAMBLE:

Recent times have witnessed the exploration of innovative teaching with learning outcomes. This shift reflects a commitment to establishing a comprehensive and inclusive learning environment, aligning with the evolving needs and dynamics of education today

The learning outcomes are often defined in terms of skills or competencies that are relevant to real-world situations, making the learning experience more meaningful and practical for students. OBE allows students to learn at their own pace and work towards a goal until they achieve it, ensuring that no student is left behind.

The OBE emphasizes assessing students' cognitive, affective, and psychomotor development. OBE is an instructional framework that centers around learners, with a primary focus on evaluating student performance based on predetermined outcomes encompassing knowledge, skills, and attitudes. Its primary aim revolves around assessing Programme outcomes and defining the knowledge, skills, and behaviors that graduates should attain upon Programme completion and in the three to five years following. Under the OBE model, the essential knowledge and skills for each specific Programme are established in advance, and students are continually assessed against these required outcomes throughout their Programme.

When crafting the curriculum for an OBE Programme, we embrace a multidisciplinary approach that takes into account the concerns, needs, and interests of students and educators, as well as societal expectations. This approach integrates core and elective courses, with a special emphasis on fostering technical, communication, and subject-specific skills through practical, research-based, and innovative teaching methods to enhance employability skills. By the conclusion of the Programme, students are expected specific skills through practical, research-based, and innovative teaching methods to enhance employability skills.

By the completion of the Programme, students are expected to have acquired proficiency in areas such as communication skills, critical thinking, psychological aptitude, affective abilities, problem-solving, analytical reasoning, research capabilities, teamwork, digital literacy, leadership, environmental awareness, moral and ethical consciousness, and other pertinent contemporary topics.

2.0 SCOPE OF OUTCOME-BASED EDUCATION (OBE):

- OBE is goal-oriented, providing clarity to both students and faculty regarding measurable learning outcomes at every stage of the educational process.
- This educational model enhances learners' knowledge, skills, and attitudes, shifting the focus from teacher-centric to student-centric learning.
- Flexibility is a hallmark of OBE, allowing teachers to adapt their lessons based on student's progress in achieving outcomes at various levels.
- OBE encourages active student involvement in the learning process, promoting lasting understanding.
- In the context of business schools, OBE is gaining prominence due to the dynamic nature of the business environment, emphasizing what students will know and be able to do.
- OBE is a philosophy that revolves around principles such as focus, curriculum design, high-performance standards, and expanded opportunities for students.

Objectives:

The Objectives of the OBE policy are stated as follows

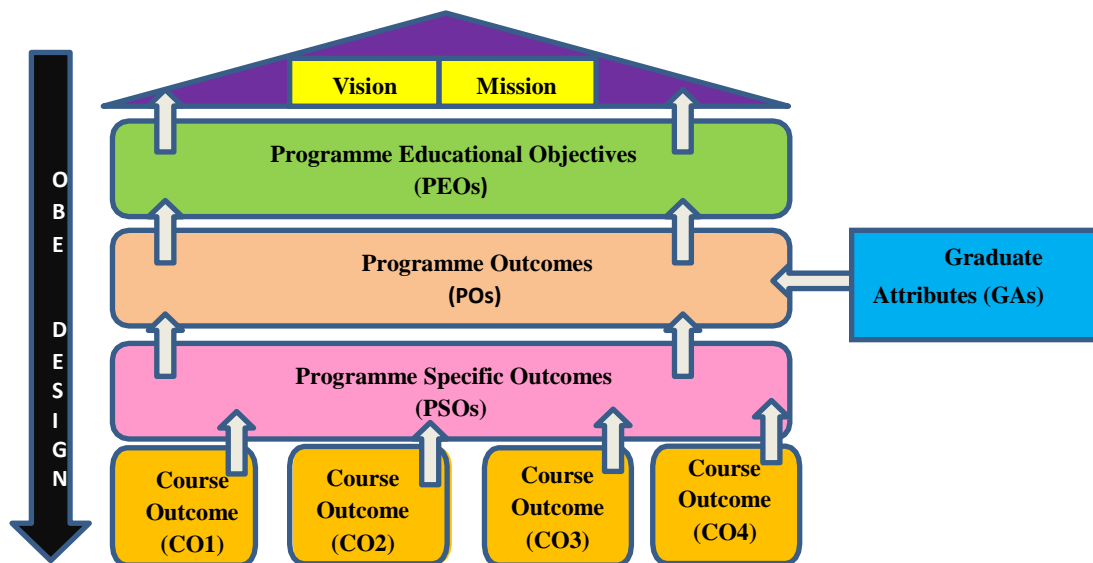
- Crafting a Curriculum Centered on Learners Outcomes.
- Establishing Programme Educational Objectives (PEOs) and Graduate Attributes in alignment with the institution's vision and mission.
- Defining Programme Outcomes (POs) aimed at achieving the graduate attributes.
- Setting Programme Specific Objectives (PSOs) for the Programme and Course Outcomes (COs) for all courses.
- Ensuring the development of learner-centric course content.

- Empowering facilitators to effectively implement OBE.
- Defining outcome-based assessment rubrics for measuring outcomes at both course and programme levels.

Distinctive Aspects of OBE:

- OBE fosters improved communication among diverse stakeholders.
- OBE facilitates the scrutiny of the institution's vision and mission.
- OBE efficiently assesses students' performance.
- OBE aids in the alignment of course outcomes and programme outcomes during each assessment

3.0 PROCESS INVOLVED IN OUTCOME-BASED EDUCATION



The procedure in Outcome-Based Education (OBE) commences with a precise articulation of the Knowledge, Skills, and Attitudes that graduates should exhibit. These are articulated as Programme Outcomes (POs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs), aligning with the Vision, Mission, Programme Educational Outcomes (PEOs) statements, as well as Graduate Attainments (GA) as outlined in Blooms Taxonomy.

The OBE procedure comprises the following stages:

- Articulation of quantifiable GAs, PEOs, POs, PSOs, and COs.
- Formulation of a fitting Outcome-Based Curriculum.
- Strategic planning of the Teaching-Learning Process.
- Ongoing Assessment utilizing appropriate assessment rubrics and tools at the appropriate times.

4.0 OBE IMPLEMENTATION COMMITTEE:

The OBE process in the institution shall be governed by the OBE committee. The compositions of the committee are as follows.

1. Principal	Chairperson
2. Controller of Examinations	Member
3. Academic Dean	Convener
4. PG Faculty	Coordinator
5. IQAC Coordinator	Member
6. Faculty-1	Member
7. Faculty-2	Member
8. Faculty-3	Member
9. Faculty-4	Member
10. Faculty-5	Member

Roles and Responsibilities:

- The committee designs the policies, structure of the OBE Curriculum, and Evaluation of outcomes.
- The committee shall provide the training and guidelines to implement the attainment of OBE.
- The committee should continue monitoring strategies for OBE and conduct an annual review to ensure effective implementation.

- The committee shall define the Programme Educational Objectives and Graduate Attributes.
- The committee will guide the departments to define Programme Outcomes, Programme Specific Outcomes
- The committee shall review the outcome attainments periodically.
- The committee shall ensure the quality assurance of the curriculum, and pedagogical teaching methods of the institutions to attain the outcomes

5.0 **OUTCOME BASED EDUCATIONAL (OBE) FRAMEWORK:**

The aim of Outcome-Based Education (OBE) is to guarantee the assessment of students' performance, knowledge, and skills in alignment with the learning objectives and subject-specific teaching methods. This is achieved by assessing the efficiency of the teaching process, fostering ongoing enhancement, and encouraging further learning through feedback that is clear, informative, and delivered in a timely and pertinent manner

Educational Programme: (Example B.Sc., BA., M.Com., M.Tech., and B.Ed., etc)

Programme is defined as the specialization or discipline of a Degree. An educational Programme is a systematic arrangement of activities and resources aimed at imparting knowledge, and skill development, and fostering learning and personal development in people of different ages and abilities. These programmes offered by educational institutions and learning organizations, focus on achieving specific educational goals through diverse subjects, teaching methods, and learning opportunities culminating in the conferral of a degree.

Programme Curriculum:

The term 'curriculum' is derived from the Latin word '**currere**'. The curriculum is the instructional and educative programme following which the student achieves their goals, ideals, and aspirations in life.

The Course of a Programme:

A course is an individual programme component that contributes to the completion of the academic programme. Courses are assigned a unit value (credit point) and a specific course code that indicates the subject area and year of each course.

A course is delineated as either a theoretical, practical or a combination of both subjects studied within a semester, such as Physics, Economics, etc. *To have uniformity, it is advised to divide the course content into four Modules or Units.*

Assessment:

Assessment involves one or more processes conducted by the institution to identify, collect, and compile data for evaluating the attainment of Course Outcomes Programme Outcomes, Programme Specific Outcomes, and Programme Educational Objectives.

Attainment/Achievement:

Attainment/Achievement is the act or reality of reaching a specified outcome in pursuit of desired objectives. Fundamentally, Attainment is gauged through the standard of academic performance, typically assessed by test or examination results.

Programme Educational Objectives (PEOs):

PEOs are concise declarations outlining the expected achievements of programme graduates in their professional journeys. These objectives place particular emphasis on graduates' performance and accomplishments that align with the institution's mission and vision within the five years following their graduation. Typically, a programme encompasses four to five PEOs.

Programme Outcomes (POs):

The POs are more specific statements delineating what students should have the capability to achieve by the time they graduate. POs are expected to be closely aligned with Graduate Attributes and describe the knowledge, competencies, and values a student should display upon graduation. Typically, a programme encompasses twelve to fifteen POs.

Programme Specific Outcomes (PSOs):

The PSOs are statements outlining what students should be able to do at the time of graduation, defined by the department offering the programme. Typically, a programme encompasses four to five PSOs

Course Outcomes (CO)/Course Learning Outcomes (CLOs): The CO/CLOs are articulate statements that encapsulate significant and fundamental learning goals that learners are expected to have acquired and can consistently demonstrate upon completing a course. CO/CLOs may be tailored for each course based on its significance

Graduate Attributes (GA):

The GA serves as exemplary qualities and skills expected from a graduate who has completed a particular programme of study.

Graduate attributes encompass the distinct qualities, knowledge, skills, attitudes, and values that graduates are expected to acquire through their higher education journey. These attributes empower individuals to expand their knowledge base, gain new skills, pursue further studies, excel in their chosen careers, and contribute positively to society. Graduate attributes define the essence of a student's university degree programme, encompassing competencies that transcend specific subjects and programme contexts. These attributes are cultivated through meaningful learning experiences embedded in the curriculum and overall university experiences, coupled with critical and reflective thinking processes.

The major attributes/attainments are:

- 1. Disciplinary Knowledge*
- 2. Communication Skills*
- 3. Critical Thinking*
- 4. Problem-solving*
- 5. Analytical Reasoning*
- 6. Research-related Skills*
- 7. Cooperation/Teamwork*
- 8. Scientific Reasoning*
- 9. Self-directed Learning*
- 10. Moral and Ethical Awareness/reasoning*
- 11. Leadership Readiness/qualities*
- 12. Lifelong Learning*

6.0 PROCESS INVOLVED IN OUTCOME-BASED EDUCATION

The procedure in Outcome-Based Education (OBE) commences with a precise articulation of the Knowledge, Skills, and Attitudes that graduates should exhibit. These are articulated as Programme Outcomes and Course Learning Outcomes, aligning with the Vision, Mission, and Programme Educational Objective statements, as well as Graduate Attainments as outlined in the Bloom Taxonomy.

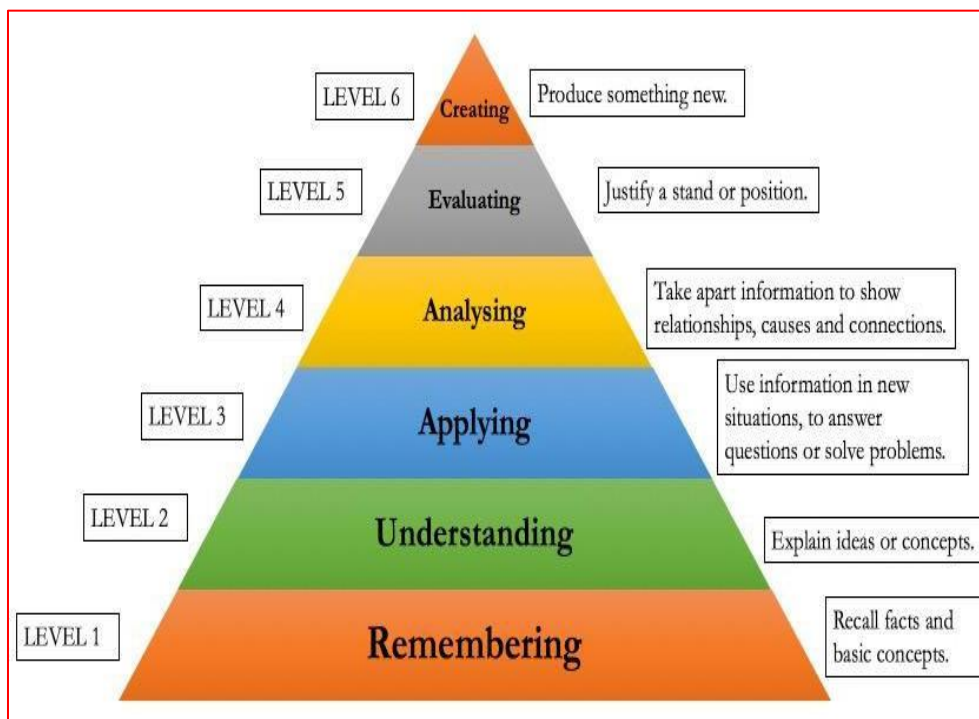
7.0 REVISED BLOOM'S TAXONOMY

Bloom's Taxonomy is a set of hierarchical ordering used to classify educational learning objectives into levels of complexity and specificity. In 1956, Benjamin Bloom and his collaborators viz., Max Englehart, Edward Furst, Walter Hill, and David Krathwohl published a framework for categorizing educational goals. Bloom's taxonomy was developed to provide a common language for teachers to discuss and exchange learning and assessment methods. The framework elaborated by Bloom and his collaborators consisted of six major categories. Specific learning outcomes can be derived from the taxonomy, though it is most commonly used to assess learning on a variety of cognitive levels.

Bloom's Taxonomy classifies educational objectives into three levels: cognitive, affective, and psychomotor. The cognitive domain includes knowledge and understanding objectives. For example, an objective in the cognitive domain might be for students to know the definition of a certain concept. The affective domain includes feeling and emotion objectives. For example, an objective in the affective domain might be for students to feel comfortable and be in the right frame of mind to assimilate what is taught. Finally, the psychomotor domain includes objectives related to physical skills. For example, an objective in the psychomotor domain might be for students to demonstrate proper technique when using lab equipment.

Today's educators have to make difficult choices about how to use their class time. Everything needs to come together perfectly, just like a puzzle. Bloom's Taxonomy provides educators with one of the earliest systematic classifications of the processes of thinking and learning. Applying Bloom's Taxonomy can promote greater understanding within each domain while providing better quality assurance when evaluating outcomes.

Today's educators have to make difficult choices about how to use their class time. Everything needs to come together perfectly, just like a puzzle. Bloom's Taxonomy provides educators with one of the earliest systematic classifications of the processes of thinking and learning. Applying Bloom's Taxonomy can promote greater understanding within each domain while providing better quality assurance when evaluating outcomes. Teachers can learn methods for using this comprehensive assessment tool effectively while gaining an understanding of the foundational principles and their relevance to today's education system. Teachers will be able to create dynamic learning experiences essential for students' growth.



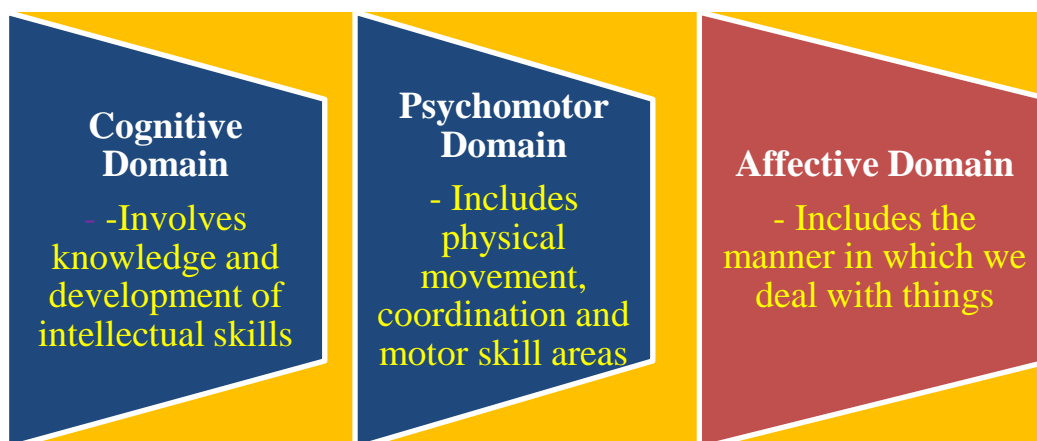
In summary, Bloom's Taxonomy is a classification system for different levels of cognitive learning. It can help educators to understand the level of understanding their students are at and provides a framework to plan goals and evaluate progress. Having this structure in place will help educators effectively teach and assess student comprehension, providing valuable insights into how students learn best.

The following alphabet is used to denote the Knowledge Level as per Bloom's Taxonomy verb.

K. Level	Parameters	Description
L1 Or K1	<i>Remembering</i>	Retrieving, recognizing, and recalling relevant knowledge from long-term memory. The students should be able to recall what they have learned about a particular topic.
L2 Or K2	<i>Understanding</i>	Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining. At this level, students need to comprehend the material they have learned so as not just to regurgitate what they have read/heard/seen but understand how all the pieces fit together for them to make sense of it all on their terms.
L3 Or K3	<i>Applying</i>	Application denotes the capability to use acquired knowledge in novel and practical situations.
L4 Or K4	<i>Analyzing</i>	Analysis encompasses the ability to deconstruct complex material or concepts into their constituent parts, facilitating a deeper understanding of their organizational structure
L5 Or K5	<i>Evaluating</i>	Evaluation refers to the ability to assess the worth or value of material, concepts, statements, creative works, or research reports for a specific purpose
L6 Or K6	<i>Creating</i>	Synthesis involves the capacity to combine individual components or subsections to create a new, comprehensive whole, whether in the form of an idea, concept, or information

Three Hierarchical Domains of Bloom's Taxonomy are:

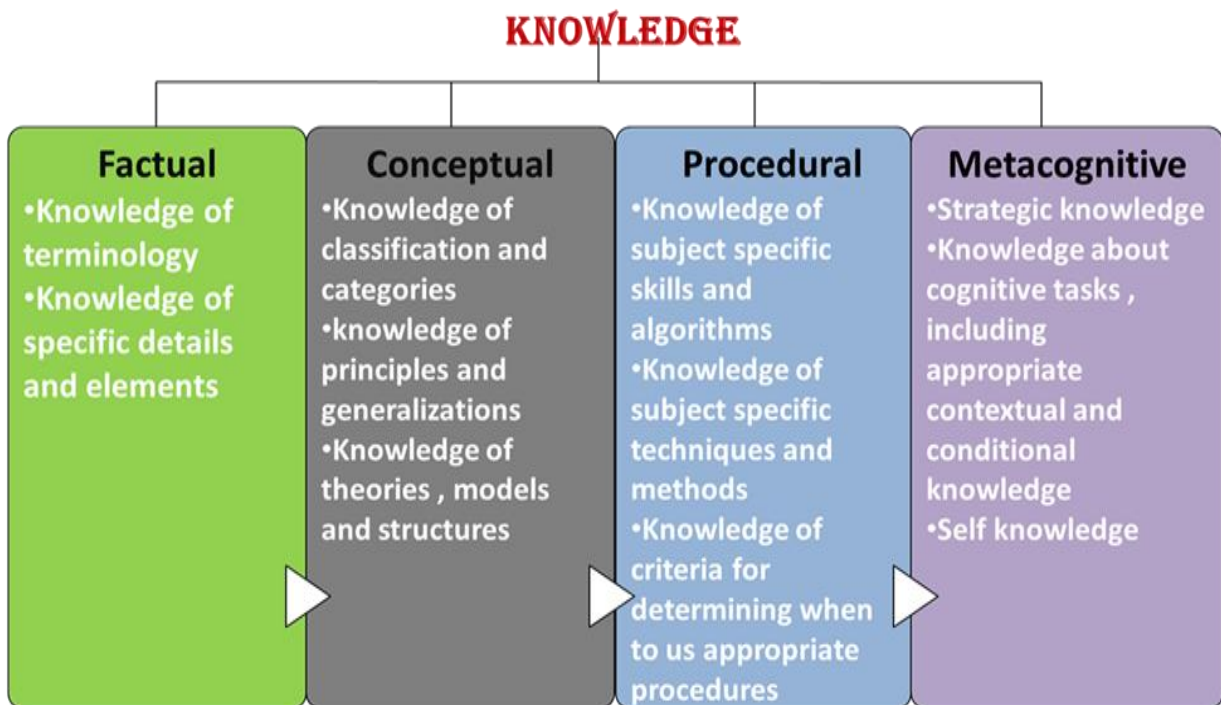
1. Cognitive Domain. 2. Psychomotor Domain.3. Affective Domain



Cognitive Domains

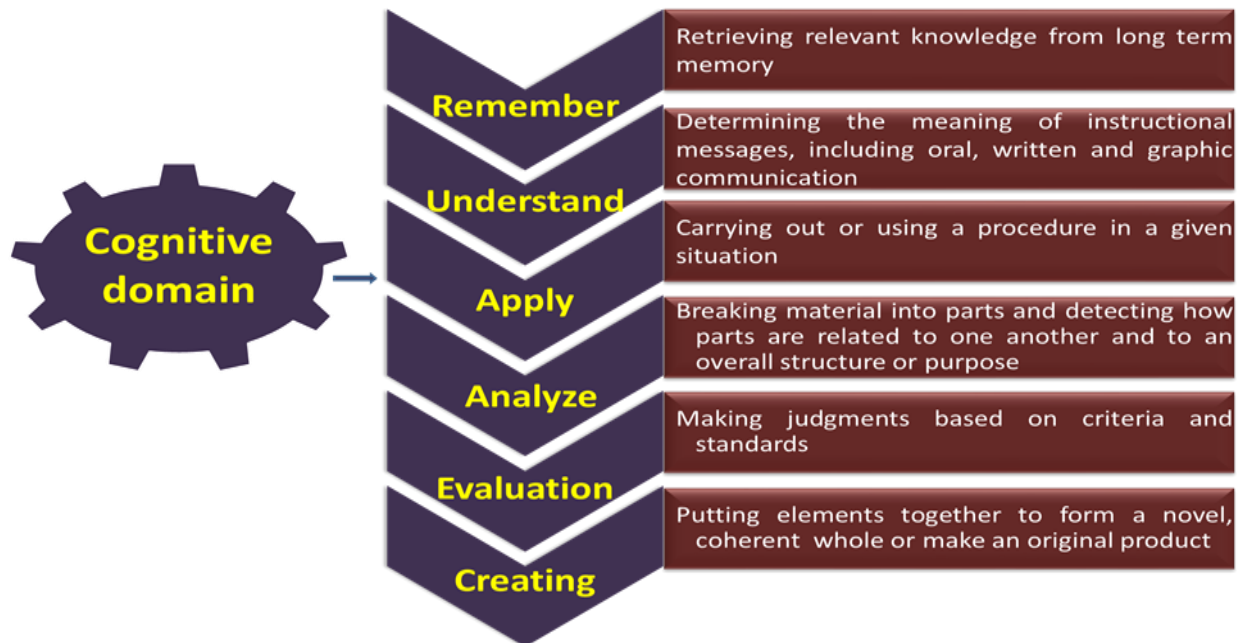


In the revised Bloom's taxonomy, knowledge which, forms the basis of six cognitive processes is given a separate taxonomy



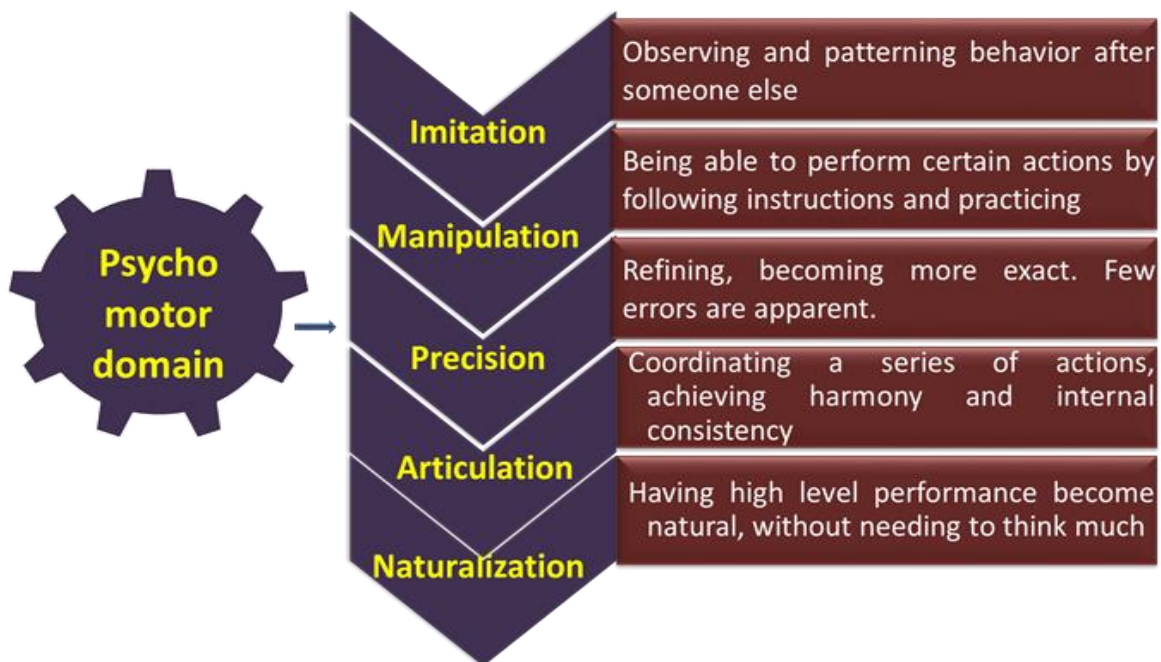
Cognitive Domain:

This is the most commonly used domain. It deals with the intellectual side of l

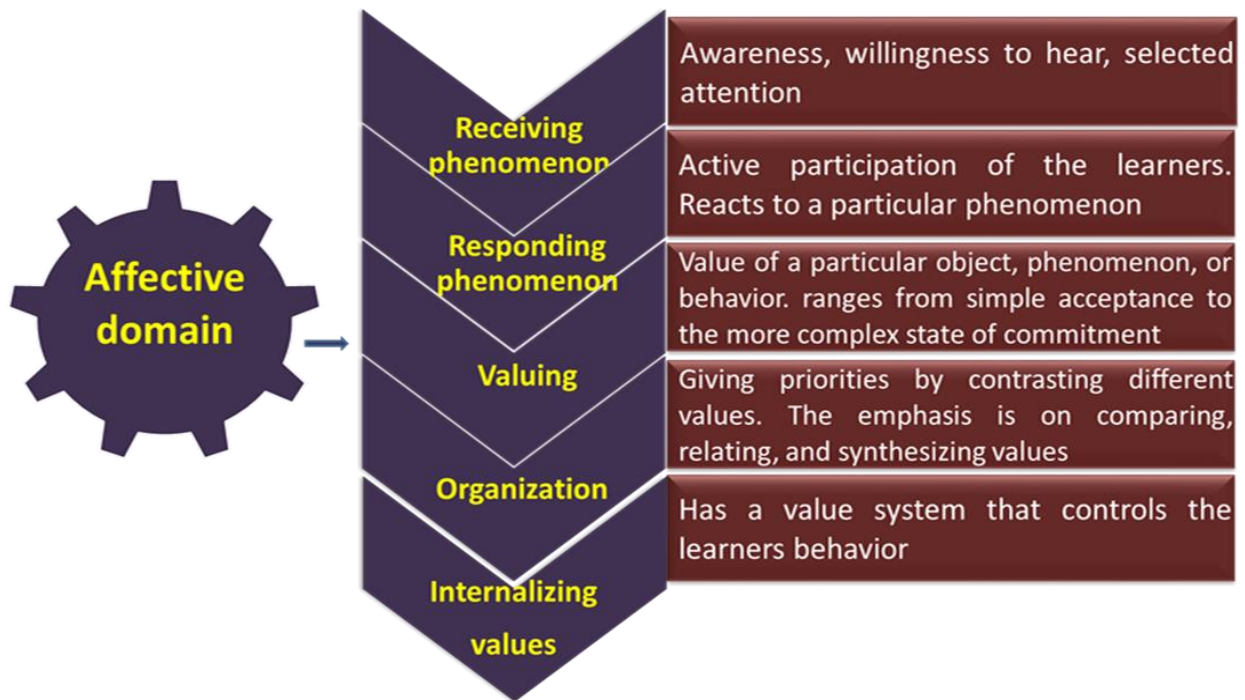


Psychomotor Domain:

This domain focuses on motor skills and actions that require physical coordination



Affective Domain



8.0 EXAMPLES FOR ACTION VERBS THAT COULD BE USED WHILE DRAFTING THE COURSE LEARNING OUTCOMES

Lower Order of Thinking			Higher Order of Thinking		
Remember	Understand	Apply	Analyze	Evaluate	Create
Define	Explain	Solve	Analyze	Reframe	Design
Describe	Describe	Apply	Compare	Criticize	Create
List	Interpret	Illustrate	Classify	Judge	Plan
State	Summarize	Calculate	Distinguish	Recommend	Formulate
Match	Compare	Sketch	Explain	Grade	Invent
Tabulate	Discuss	Prepare	Differentiate	Measure	Develop
Record	Estimate	Chart	Appraise	Test	Organize
Label	Express	Choose	Conclude	Evaluate	Produce

Illustration (use of action verb with respect to knowledge dimension and order of thinking):

<p>Note:</p> <ol style="list-style-type: none"> Factual means concerned with facts or contains facts Conceptual means it deals primarily with abstract or original thoughts Cognitive means the set of mental abilities required to acquire, process, and use the information to solve a particular challenge Meta- cognitive means the process of thinking about one's thinking and learning. This refers to the diverse strategies students employ to regulate their thoughts and emotions. It includes planning, monitoring, and assessing their performance, such as identifying an ineffective strategy and deciding to switch to a different one.
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Knowledge level (CDL)	Factual	Conceptual	Procedural	Meta-cognitive
<i>Remember- K1</i>	List properties of water	Recognize characteristics of gold metal	Explain the working of the pump	Identify strategies for report writing
<i>Understand- K2</i>	Summarize the features of a refrigerator	Classify adhesives by toxicity.	Explain assembly instructions.	Predict the behavior of member
<i>Apply- K3</i>	Respond to Frequently asked questions.	Provide advice to team members	Carry out pH Tests of water samples.	Use modern techniques to get the solution
<i>Analyse- K4</i>	Explain the Selection of tool/activity.	Differentiate LOT and HOT	Integrate Compliance with regulations.	Assess the project work
<i>Evaluate- K5</i>	Select the appropriate tool	Determine the relevance of results.	Judge efficiency of sampling techniques.	Reflect on one's progress.
<i>Create- K6</i>	Design a log book for daily class activities	Assemble a team of experts.	Design efficient project workflow.	Create a learning portfolio.

9.0 DESIGNING OF CURRICULUM FOR A PROGRAMME BASED ON OBE FRAMEWORK

1. Based on the guidelines the OBE curriculum for a programme is to be designed based on the following criteria
 2. The Vision and Mission of the College
 3. The Vision and Mission of the Department (shall be framed keeping in view the Vision and Mission of the College)
 4. The course content of the curriculum should reflect the Vision and Mission of the College / the department and what students should achieve by completion of the Programme
- The curriculum of the programme should define the
 - a) Programme Educational Objectives (PEOs)
 - b) Programme Outcomes (POs)
 - c) Programme Specific Outcomes (PSOs)
 - d) Cognitive Domain Levels (CDLs) on Bloom's Taxonomy
 - Based on criteria 9(4) above, the course content is to be framed with definite
 - a) Course Objectives (COs)
 - b) Course Learning Outcomes(CLOs)/Course Outcomes(COs)
 - Mapping of CLOs/COs with POs & PSOs for each course

10.0 GUIDELINES TO IMPLEMENT

THE VISION AND MISSION OF THE COLLEGE

Vision: The college is guided by the visionary zeal of providing value-based education to everyone irrespective of religion, caste creed, or sex by which the character is formed, intellect is explained and one can stand on his/her feet

Mission: To transform young men and women who come to learn not only from books but also life and to share the experience of working and playing together, this inculcates life skills to become good citizens with integrity and discipline

The Vision and Mission of the Department- Guidelines

The vision and mission of the department are established in keeping view of the following steps:

- The Vision and Mission of the college are taken as basis.
- The Mission and Vision of the Department are drafted by understanding the current skill requirement at both the local and global industry levels and the advances made in the field of technology as well as the current demand for R & D.
- The draft of the vision & mission is prepared in consultation with the departmental faculty members and circulated to Alumni, Professional Bodies, Industry Representatives, the Board of Studies (BOS), and Parents for their views.
- The accepted views are analyzed and reviewed to check their compatibility with the vision and mission of the department and the college and incorporated in the draft and finalized.

Designing the Programme Curriculum

The views of the existing curriculum with inputs to revise it so that the students acquire knowledge in the chosen programme and apply it professionally and ethically with responsibility in various fields such as social, economic, political, environmental, health, and safety. The draft revised curriculum is to be circulated with

- The members are drawn from various academic institutions, R&D Organizations, Industry Partners, Alumni, Professional Bodies, the Board of Studies (BOS), Parents, and other stakeholders.
- Skill in demand analysis is carried out periodically to identify the core areas in the programme domain that are consistent with employer needs
- The Programme Educational Objectives (PEOs), Programme Outcomes (POs), and Programme Specific Outcomes (PSOs) are established and checked for consistency with the vision & mission statement of the department.

Draft to Design the PEOs

PEO-1:	PROFESSIONAL GROWTH Keep on discovering new avenues in the chosen field and exploring areas that remain conducive to research and development.
PEO-2:	CORE PROFICIENCY To expertise the students to organize, understand, evaluate, and solve problems by providing hands-on experience through modern tools necessary for practice.
PEO-3:	TECHNICAL PROFICIENCY To have interdisciplinary knowledge and relate it to the technical aspects as the impact on the subject concerned is very wide.
PEO -4:	MANAGEMENT SKILLS Encourage personality development skills, time management, crisis management, Stress interviews, and working as a team.
PEO-5:	LEARNING ENVIRONMENT To provide students with knowledge and capability in formulating and analysis of mathematical models of real-life applications.

Programme Outcomes (POs): POs should describe what a student is expected to acquire throughout the tenure of the programme regarding the various skills, knowledge, and social responsibility.

PO1	Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of Programme of study.
PO2	Communication Skills: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information clearly and concisely to different groups.
PO3	Critical Thinking: Capability to apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, and beliefs based on empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies, and theories by following a scientific approach to knowledge development.
PO4	Problem-solving: Capacity to extrapolate from what one has learned and apply competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real-life situations.

PO5	Analytical Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and address opposing viewpoints.
PO6	Research-related Skills: A sense of inquiry and capability for asking relevant/appropriate questions, problematizing, synthesizing, and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation
PO7	Cooperation/Teamwork: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.
PO8	Scientific Reasoning: Ability to analyze, interpret, and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence, and experiences from an open-minded and reasoned perspective
PO9	Self-directed Learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
PO10	Moral and Ethical Awareness/Reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification, or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO11	Leadership Readiness/Qualities: Capability for mapping out the tasks of a team or an organization, setting direction, formulating an inspiring vision, building a team that can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, smoothly and efficiently.
PO12	Lifelong Learning: Ability to acquire knowledge and skills, including, learning how to learn, that is necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social, and cultural objectives, and adapting to changing trades and demands of the workplace through knowledge/skill development/rescaling.

Programme Specific Outcomes (PSOs):

PSOs should describe what a graduate of a specific Programme should be able to do at the end of the Programme. The PSOs are specific outcomes of a Programme and are to be framed by the respective departments.

Note: A draft PSO framed for the M.Sc Mathematics department is selected for reference. A Programme can have three to five PSOs

PSOs	PROGRAMME SPECIFIC OUTCOMES Upon completion of the courses the student will acquire to
PSO-1	Develop problem-solving skills and apply them independently to problems in pure and applied mathematics.
PSO-2	Analyse complex mathematical ideas and arguments and improve their own learning and performance.
PSO-3	Develop abstract mathematical thinking.
PSO-4	Apply the knowledge of mathematical concepts in interdisciplinary fields
PSO-5	Employ confidently the knowledge of mathematical software and tools for treating the complex mathematical problems and scientific investigations and pursue research in challenging areas of pure/applied mathematics.

Course Learning Outcomes (CLOs)/Course Outcomes (COs)

Course Learning Outcomes articulate the expected student capabilities upon completing a course. Writing clear and effective learning outcomes is crucial for both educators and learners. Here's a step-by-step guide on how to write learning outcomes:

- Ensure that the language you use in the learning outcomes is clear and understandable to the students.
- Begin the learning outcome sentence with a concise and clear statement that indicates what the learner will be able to do after completing the course or programme. Suitable action verbs to be chosen that precisely describe the skills or knowledge students are expected to demonstrate. These verbs should be measurable and indicate the level of cognitive engagement required. The examples of action verbs at different cognitive levels are already mentioned in the policy/guidelines. Avoid vague terms like "know," "understand," or "appreciate," which don't provide clear guidance on what students are expected to demonstrate.

- Learning outcomes should be concise and focused. Each outcome should represent a specific skill or area of knowledge that they want students to achieve so that at the end of the course, a successful student will be able to analyze and evaluate the strengths and weaknesses of the programme studied.
- Ensure that the learning outcomes align with the content and assessments in your course or programme. They should reflect the key objectives and goals you have set for your teaching.
- The structure "Action Verb + Standard or Verb + Condition or Verb + Standard + Condition" is a way of expressing conditions or requirements in English. Let's break down the components and their meanings:
- Periodically feedback, reviews, and revisions of the learning outcomes to ensure they remain relevant and aligned with the teaching goals and the evolving needs of the students is to be undertaken by sharing the COs with colleagues, peers, and alumni, They can provide valuable insights and help you refine your statements for clarity and effectiveness to address the following questions?

<i>Specific</i>	<i>Is there a clear and detailed description of the behavior and situation in which it will occur? Is it focused, well-defined, and concrete?</i>
<i>Measurable</i>	<i>Can the results of the action be easily observed and quantified?</i>
<i>Achievable</i>	<i>Is it possible to attain the desired outcome with a reasonable amount of effort and application? Are you setting realistic goals?</i>
<i>Relevant</i>	<i>Does the outcome hold importance or value for the learner or stakeholder? Is it feasible to reach this particular goal?</i>
<i>Time-Bound</i>	<i>Have you established a defined time frame, rate, quantity, percentage, or frequency for accomplishing this outcome? When will this objective be completed?</i>

- **Action Verb:** This is a verb that indicates an action or activity. It's the core of the sentence, and it describes what needs to be done or what action is being considered.
- **Standard:** The standard is a benchmark or a set of criteria that must be met. It specifies a level of performance or a particular condition that is expected or required.
- **Condition:** The condition, if present, adds further details or constraints to the action. It specifies the circumstances under which the action should be performed or the standard should be met. Now, let's look at some examples to illustrate how this structure works:
- **Action Verb + Standard:** This part of the structure sets a basic requirement or expectation for an action.
 - Example 1:** "You should complete the project by Friday." Action Verb: "Complete"
 - Standard: "By Friday"
 - Meaning:** The expectation is to finish the project by the end of Friday.
 - Example 2:** "She must pass the exam."
 - Action Verb: "Pass"
 - Standard: None (implied)
 - Meaning:** Passing the exam is required; there is no specific condition mentioned.
- **Action Verb + Condition:** Here, the condition introduces circumstances or situations under which the action should be performed.
 - Example 1:** "He can join the team if he has the required qualifications."
 - Action Verb: "Join".
 - Condition: "If he has the required qualifications"
 - Meaning:** He is allowed to join the team, but only if he meets the qualification requirements.
 - Example 2:** "They should eat their vegetables before having dessert."
 - Action Verb: "eat"
 - Condition: "Before having dessert"
 - Meaning:** Eating vegetables is expected, but it should be done before indulging in dessert.
 - Condition: "Unless you encounter technical difficulties"
 - Meaning:** The report must be submitted by Monday, but if there are technical issues, an exception will be made.
- In summary, this structure helps convey expectations, requirements, or conditions related to a specific action or activity. It can be used to make instructions, set deadlines, establish prerequisites, or describe conditional scenarios.**
- **Action Verb + Standard + Condition:** This combines both a standard and a condition to provide a more detailed requirement.

➤ **Example:** "You need to submit the report by Monday unless you encounter technical difficulties."

Action Verb "submit"

Standard: "by Monday"

Condition: "Unless you encounter technical difficulties"

Meaning: The report must be submitted by Monday, but if there are technical issues, an exception will be made.

In summary, this structure helps convey expectations, requirements, or conditions related to a specific action or activity. It can be used to make instructions, set deadlines, establish prerequisites, or describe conditional scenarios

Assessment Methods:

Assessment is a core academic activity and an essential component of the learning process. Assessment of the programme indicates the quality and extent of student achievement or performance, and therefore by inference a judgment about the student's learning. It inevitably shapes the learning that takes place; that is, what students learn and how they learn it should reflect closely the purposes and objectives of the programme.

Programme assessment is an ongoing process to support educational quality and student achievement. It is the main mechanism to monitor the effectiveness of the learning environment based on evidence that determines whether students have met the learning outcomes and programme objectives

The College should ensure that assessment occurs consistently and systematically so that the results contribute to institution-wise planning that supports quality education. Assessment practices within the institution are based on the general principles of validity and reliability, manageability, and fairness. It is expected that staff use these principles while planning, implementing, and reviewing assessment tasks and processes. The question papers and assignment components are specifically planned for the attainment of POs & COs. Direct and Indirect Methods are used for the assessment of the attainment of CO, and PO. Assessment is done in two ways

➤ **The Direct Method:**

The direct method of assessment involves three domains of student learning i.e. cognitive

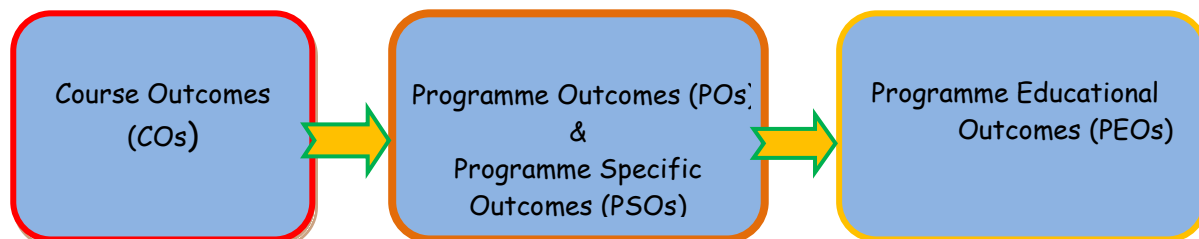
domain, affective domain, and psychomotor domain. The assessment is done in two ways. - Formative and Summative.

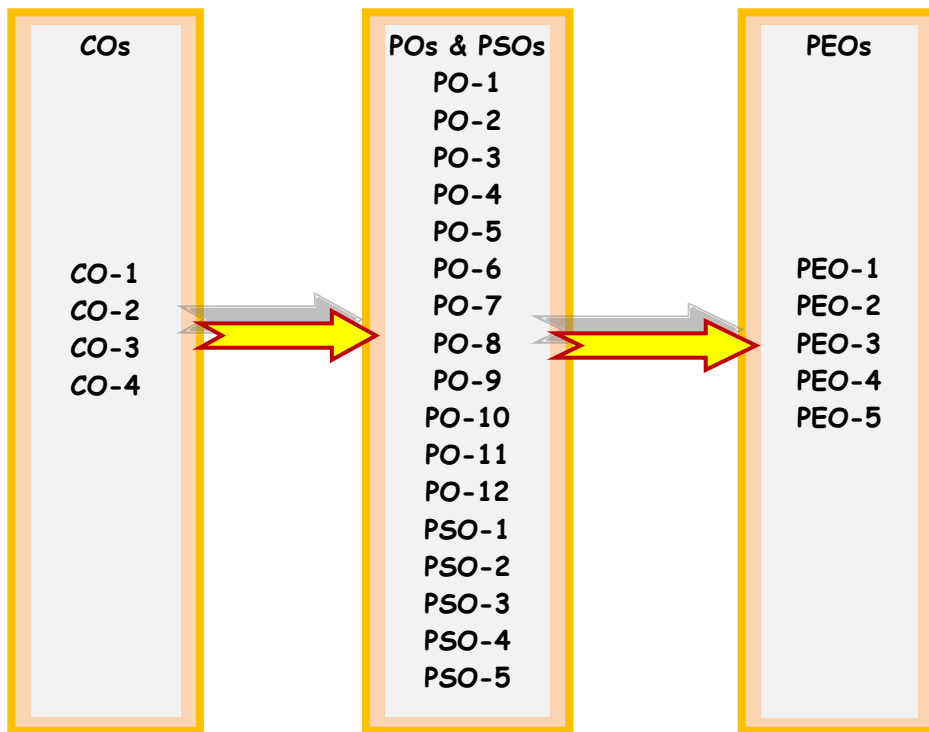
(**Note:** Assessment Rubrics & Tools. Formative and Summative assessments are called Rubrics. The components of formative assessment are called Tools.)

- **Formative (CCA) /Continuous Internal Assessment (CIA) or Rubrics:** The tools of assessment are - class tests/ class assignments/visits to research institutions/ industries for experiential learning to enhance their knowledge beyond the discipline/ deputing students to participate and present research articles in national/ international seminars/workshops/ conferences/ self-study/ extension activities to learn the moral & ethical awareness/ framing questions/ group discussions and workshops, publication of research articles in peer-reviewed journals, online SWAYAM- MOOC courses, etc.
- **Summative (End semester exam):** Theory exam, lab/practical exams, and project/internship evaluation.
- **The Indirect Method:** The students' feedback is taken for the attainment of course outcomes for each course after each semester. Programme exit survey from the student on completion of the programme. An alumni survey and an employer survey need to be conducted.

11.0 ATTAINMENT CALCULATION

There are four levels of outcome Course Learning Outcome (CLO)/Course Outcome (CO), Programme Outcome (PO), Programme Specific Outcome (PSO), and Programme Educational Objective (PEO). The relationship between outcomes (CO to PO/PSO & PO/PSO to PEO) is shown below.





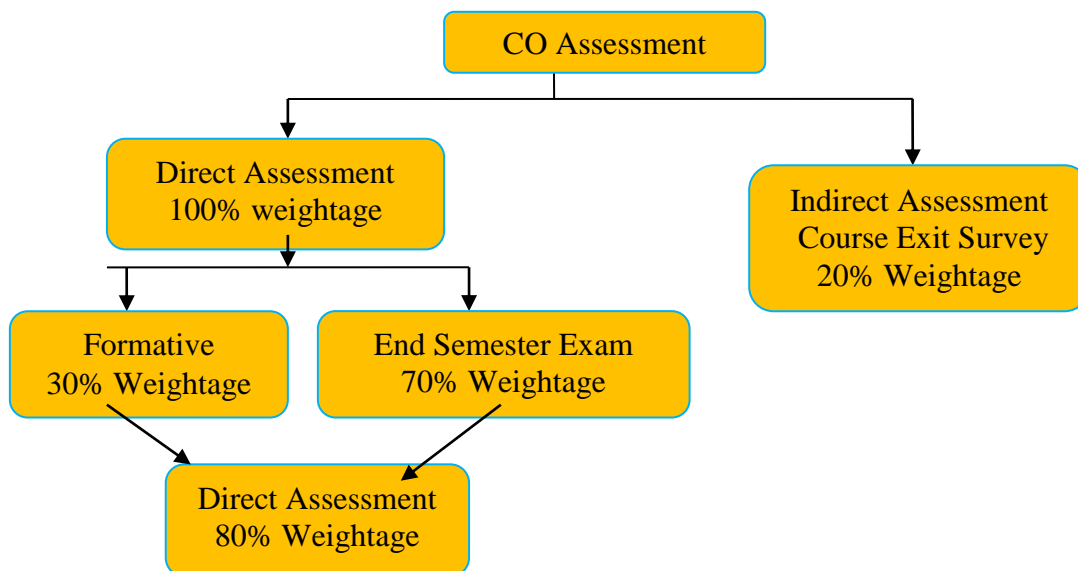
Note:

- The Course Outcomes (COs) articulate the expected student capabilities upon completing a course.
- POs, defined by Accreditation Agencies encapsulate statements about the knowledge, skills, attitudes, and graduate attributes within a Programme. Programme Outcomes manifest graduates' ability to apply knowledge in Basic Sciences, Humanities, Social Sciences, and Commerce and Management, demonstrating proficiency in professional core subjects, electives, and projects. Graduates are expected to adhere to professional and ethical responsibilities for societal benefit, facilitating further studies and engagement in research development
- Programme Specific Outcomes specify the actions and capabilities expected from graduates of a specific Programme.
- Programme Educational Objectives offer detailed descriptions of career and professional accomplishments that graduates are prepared to achieve several years after graduation
- Programme Specific Outcomes specify the actions and capabilities expected from graduates of a specific Programme.
- Programme Educational Objectives offer detailed descriptions of career and professional accomplishments that graduates are prepared to achieve several years after graduation

Note:

- At the UG level for Basic Sciences & Humanities Programmes, having courses offered from different departments, the POs may be treated as common but the PSOs are to be that of the course offered by the relevant department.
- The course instructor should map the COs with the relevant POs based on existing correlation relationships. It is important to note that while each PO may not necessarily map to a specific CO, all POs must be mapped to at least one of the specified PSOs, as depicted in the following flow chart. Internal assessment (Formative) contributes 30% and the end-semester examination contributes 70% to the total attainment of CO

12.0 THE CO ASSESSMENT PROCESS:



ASSESSMENT PROCESS FOR COs ATTAINMENT: DIRECT METHOD

For the evaluation and assessment of CO's rubrics are used

The CO assessment rubrics are as follows. Course Outcome is evaluated based on the performance of students in internal assessments and end examination of a Course. The internal assessment contributes 70% and the end-semester examination contributes 30% to the total attainment of CO

The CO Assessment Tools: The various assessment tools to be used and the frequency with which the assessment is carried out for the PO are to be decided by the college at the beginning of the academic year.

Example of assessment tools: Class tests/ class assignments/visits to research institutions/ industries for experiential learning to enhance their knowledge beyond the discipline/ deputing students to participate and present research articles in national/ international seminars/workshops/ conferences/ self-study/ extension activities to learn the moral & ethical awareness/ framing questions/ group discussions and workshops, publication of research articles in peer-reviewed journals, **Mapping of assessment tools to POs/PSOs with frequency of Assessment**

13.0 THE CO ATTAINMENT FOR EACH TOOL IS CALCULATED BY DIRECT METHOD:

The calculation of CO attainment of *M.Sc., Mathematics* is taken as a working model. It is advisable to divide the courses into four Modules /Units. Each module/unit may have one CO with more than one outcome.

To calculate CO attainment, the formative/CCA and summative weightage for CO1, CO2, CO3, and CO4 are distributed to different assessment tools as shown in the calculation tables.

Here for formative assessment, C1 assessment questions are to be set related to CO1 & CO2, and for C2 assessment the questions are to be set related to CO3& CO4. For the

14.0 COURSE OUTCOMES ATTAINMENT CALCULATION

DIRECT METHOD

Note: The numerical values in the table are transferred from excel sheets.
There is a possibility of some arithmetic Errors.

**Table -1 DIRECT METHOD
CALCULATION OF CO ATTAINMENT OF THE COMPONENT OF FORMATIVE ASSESSMENT – C1&C2
(Component–CLASS TEST)**

P.G. DEPARTMENT OF MATHEMATICS												
Course Code:		MMT20A101	Title of the		GROUP THEORY				QP Code:			
Name of the Course Instructor :			XXXX						ATTAINMENT			
Sl. No	Name of the Candidate	Roll No	C1 IA TEST 40 MARKS		TOTAL (40)	C2 IA TEST 40 MARKS		TOTAL (40)	(10/20) *3	(9/20) *3	(13/20) *3	(14/20) *3
			CO1 (20M)	CO2 (20M)		CO3 (20M)	CO4 (20M)		CO1	CO2	CO3	CO4
1	ANUSHA B R	MMA21451	10	9	19	13	14	27	1.50	1.35	1.95	2.10
2	ANUSHA C	MMA21452	18	15	33	14	16	30	2.70	2.25	2.10	2.40
3	CHANDANA VEENA S	MMA21453	16	11	27	10	12	22	2.40	1.65	1.50	1.80
4	CHARAN H S	MMA21454	14	9	23	9	10	19	2.10	1.35	1.35	1.50
5	INDUSHREE A	MMA21455	9	10	19	16	16	32	1.35	1.50	2.40	2.40
6	KAVYA C	MMA21456	11	9	20	11	11	22	1.65	1.35	1.65	1.65
7	KRUPA M H	MMA21457	12	12	24	16	16	32	1.80	1.80	2.40	2.40
8	MADIHA KHANUM	MMA21458	16	19	35	15	13	28	2.40	2.85	2.25	1.95
9	MEGHANA L	MMA21459	11	11	22	11	9	20	1.65	1.65	1.65	1.35
10	NEETHU C J	MMA21460	15	16	31	15	18	33	2.25	2.40	2.25	2.70
11	POOVAMMA M K	MMA21461	19	19	38	16	20	36	2.85	2.85	2.40	3.00
12	PRINCY INFANT MARY R	MMA21462	17	18	35	16	17	33	2.55	2.70	2.40	2.55
13	PRIYA UTHAPPA	MMA21463	16	16	32	16	20	36	2.40	2.40	2.40	3.00
14	RAKSHITHA M	MMA21464	9	5	14	9	4	13	1.35	0.75	1.35	0.60
15	ROJASHREE M R	MMA21465	16	18	34	17	18	35	2.40	2.70	2.55	2.70
16	SAHANA S	MMA21466	18	18	36	19	19	38	2.70	2.70	2.85	2.85
17	SANDHYA RANI	MMA21468	16	17	33	15	16	31	2.40	2.55	2.25	2.40
18	SANJANA MONDAL	MMA21469	14	19	33	15	16	31	2.10	2.85	2.25	2.40
19	SHALINI K	MMA21470	20	20	40	16	16	32	3.00	3.00	2.40	2.40
20	SHALINI S	MMA21471	15	12	27	11	15	26	2.25	1.80	1.65	2.25
21	SHALOM P	MMA21472	14	19	33	15	13	28	2.10	2.85	2.25	1.95
22	SHIVANI B	MMA21473	19	19	38	15	15	30	2.85	2.85	2.25	2.25
23	SHRIDHU M K	MMA21474	9	9	18	15	12	27	1.35	1.35	2.25	1.80
24	STEPHEN MATHEW	MMA21475	13	20	33	17	18	35	1.95	3.00	2.55	2.70
25	SUPREETHA G S	MMA21476	16	16	32	17	14	31	2.40	2.40	2.55	2.10
26	YASHASWINI	MMA21477	11	12	23	14	16	30	1.65	1.80	2.10	2.40
			CO1	CO2			CO3	CO4				
Attempts			26	26			26	26				
Above 40%			26	25			26	25				
%Attainment			100	96.15			100	96.15				
Attainment on a 3.00 point Scale			3.00	2.88			3.00	2.88				

**Table -2 DIRECT METHOD
CALCULATION OF CO ATTAINMENT OF THE COMPONENT OF FORMATIVE ASSESSMENT – C1&C2
(Component– ASSIGNMENT)**

P.G. DEPARTMENT OF MATHEMATICS												
Course Code:		MMT20A101		Title of the Course :			GROUP THEORY		QP Code: 87121			
Name of the Course Instructor :			XXXXX									
Sl. No	Name of the Candidate	Roll No	C1 IAASSIGNMENT20 MARKS		TOTAL (20)	C2 IA ASSIGNMENT 20 MARKS		TOTAL (20M)	ATTAINMENT			
			CO1 (10M)	CO2 (10M)		CO3 (10M)	CO4 (10M)		CO1	CO2	CO3	CO4
1	ANUSHA B R	MMA21451	7	9	16	9	8	17	2.10	2.70	2.70	2.40
2	ANUSHA C	MMA21452	10	10	20	9	9	18	3.00	3.00	2.70	2.70
3	CHANDANA VEENA S	MMA21453	9	9	18	6	10	16	2.70	2.70	1.80	3.00
4	CHARAN H S	MMA21454	10	10	20	10	8	18	3.00	3.00	3.00	2.40
5	INDUSHREE A	MMA21455	10	9	19	3	9	12	3.00	2.70	0.90	2.70
6	KAVYA C	MMA21456	7	7	14	6	6	12	2.10	2.10	1.80	1.80
7	KRUPA M H	MMA21457	10	9	19	7	7	14	3.00	2.70	2.10	2.10
8	MADIHA KHANUM	MMA21458	8	7	15	8	8	16	2.40	2.10	2.40	2.40
9	MEGHANA L	MMA21459	10	10	20	10	10	20	3.00	3.00	3.00	3.00
10	NEETHU C J	MMA21460	9	8	17	7	7	14	2.70	2.40	2.10	2.10
11	POOVAMMA M K	MMA21461	10	10	20	7	10	17	3.00	3.00	2.10	3.00
12	PRINCY INFANT MARY R	MMA21462	10	8	18	10	10	20	3.00	2.40	3.00	3.00
13	PRIYA UTHAPPA	MMA21463	8	6	14	10	7	17	2.40	1.80	3.00	2.10
14	RAKSHITHA M	MMA21464	10	9	19	10	10	20	3.00	2.70	3.00	3.00
15	ROJASHREE M R	MMA21465	9	10	19	8	8	16	2.70	3.00	2.40	2.40
16	SAHANA S	MMA21466	9	9	18	10	10	20	2.70	2.70	3.00	3.00
17	SANDHYA RANI	MMA21468	8	8	16	10	7	17	2.40	2.40	3.00	2.10
18	SANJANA MONDAL	MMA21469	10	10	20	8	9	17	3.00	3.00	2.40	2.70
19	SHALINI K	MMA21470	9	9	18	10	7	17	2.70	2.70	3.00	2.10
20	SHALINI S	MMA21471	9	9	18	7	10	17	2.70	2.70	2.10	3.00
21	SHALOM P	MMA21472	10	10	20	9	9	18	3.00	3.00	2.70	2.70
22	SHIVANI B	MMA21473	10	10	20	7	10	17	3.00	3.00	2.10	3.00
23	SHRIDHU M K	MMA21474	10	10	20	5	7	12	3.00	3.00	1.50	2.10
24	STEPHEN MATHEW	MMA21475	10	10	20	7	10	17	3.00	3.00	2.10	3.00
25	SUPREETHA G S	MMA21476	9	9	18	9	8	17	2.70	2.70	2.70	2.40
26	YASHASWINI	MMA21477	10	10	20	8	9	17	3.00	3.00	2.40	2.70
			CO1	CO2		CO3	CO4					
		Attempts	26	26		26	26					
		Above 40%	26	26		25	26					
		% Attainment	100	100		96.15	100					
		Attainment on a 3.00 point Scale	3	3		2.88	3					

**Table -3 DIRECT METHOD
CALCULATION OF CO ATTAINMENT OF THE COMPONENT OF FORMATIVE ASSESSMENT – C1&C2
(Component–SEMINAR)**

P.G. DEPARTMENT OF MATHEMATICS												
Course Code:		MMT20A101	Title of the Course			GROUP THEORY			QP Code: 87121			
Name of the Course Instructor :			XXXXXX									
Sl. No	Name of the Candidate	Roll No	C1 IA Seminar 20 MARKS		TOTAL (40)	C2 IA Seminar 20 MARKS		TOTAL (20)	ATTAINMENT			
			CO1 (10M)	CO2 (10M)		CO3 (10M)	CO4 (10M)		CO1	CO2	CO3	CO4
1	ANUSHA B R	MMA21451	10	10	20	10	9	19	3.00	3.00	3.00	2.70
2	ANUSHA C	MMA21452	10	10	20	10	10	20	3.00	3.00	3.00	3.00
3	CHANDANA VEENA S	MMA21453	10	10	20	10	10	20	3.00	3.00	3.00	3.00
4	CHARAN H S	MMA21454	10	10	20	10	10	20	3.00	3.00	3.00	3.00
5	INDUSHREE A	MMA21455	10	10	20	10	9	19	3.00	3.00	3.00	2.70
6	KAVYA C	MMA21456	10	10	20	10	8	18	3.00	3.00	3.00	2.40
7	KRUPA M H	MMA21457	10	10	20	10	9	19	3.00	3.00	3.00	2.70
8	MADIHA KHANUM	MMA21458	10	10	20	10	9	19	3.00	3.00	3.00	2.70
9	MEGHANA L	MMA21459	10	10	20	10	10	20	3.00	3.00	3.00	3.00
10	NEETHU C J	MMA21460	10	10	20	10	8	18	3.00	3.00	3.00	2.40
11	POOVAMMA M K	MMA21461	10	10	20	10	9	19	3.00	3.00	3.00	2.70
12	PRINCY INFANT MARY R	MMA21462	10	10	20	10	10	20	3.00	3.00	3.00	3.00
13	PRIYA UTHAPPA	MMA21463	10	10	20	10	9	19	3.00	3.00	3.00	2.70
14	RAKSHITHA M	MMA21464	10	10	20	10	10	20	3.00	3.00	3.00	3.00
15	ROJASHREE M R	MMA21465	10	10	20	10	10	20	3.00	3.00	3.00	3.00
16	SAHANA S	MMA21466	10	10	20	10	10	20	3.00	3.00	3.00	3.00
17	SANDHYA RANI	MMA21468	10	10	20	10	10	20	3.00	3.00	3.00	3.00
18	SANJANA MONDAL	MMA21469	10	10	20	10	9	19	3.00	3.00	3.00	2.70
19	SHALINI K	MMA21470	10	10	20	10	8	18	3.00	3.00	3.00	2.40
20	SHALINI S	MMA21471	10	10	20	10	10	20	3.00	3.00	3.00	3.00
21	SHALOM P	MMA21472	10	10	20	10	8	18	3.00	3.00	3.00	2.40
22	SHIVANI B	MMA21473	10	10	20	10	10	20	3.00	3.00	3.00	3.00
23	SHRIDHU M K	MMA21474	10	10	20	10	10	20	3.00	3.00	3.00	3.00
24	STEPHEN MATHEW	MMA21475	10	10	20	10	10	20	3.00	3.00	3.00	3.00
25	SUPREETHA G S	MMA21476	10	10	20	10	10	20	3.00	3.00	3.00	3.00
26	YASHASWINI	MMA21477	10	10	20	10	10	20	3.00	3.00	3.00	3.00
			CO1	CO2		CO3	CO4					
		Attempts	26	26		26	26					
		Above 40%	26	26		26	26					
		% Attainment	100	100		100	100					
		Attainment on a 3.00 point Scale	3	3		3	3					

**Table -4 DIRECT METHOD
CALCULATION OF CO ATTAINMENT OF THE COMPONENT OF FORMATIVE ASSESSMENT – C1&C2
(Component– QUIZ)**

P.G. DEPARTMENT OF MATHEMATICS												
Course Code: MMT20A101		Title of the Course			GROUP THEORY				QP Code: 87121			
Name of the Course Instructor :			XXXXXX									
Sl. No	Name of the Candidate	Roll No	C1 IA Quiz 20 MARKS		TOTAL (20)	C2 IA Quiz 20 MARKS		TOTAL (20)	ATTAINMENT			
			CO1 (10M)	CO2 (10M)		CO3 (10M)	CO4 (10M)		CO1	CO2	CO3	CO4
1	ANUSHA B R	MMA21451	0	5	5	10	5	15	0.00	1.50	3.00	1.50
2	ANUSHA C	MMA21452	10	10	20	10	10	20	3.00	3.00	3.00	3.00
3	CHANDANA VEENA S	MMA21453	7	8	15	5	10	15	2.10	2.40	1.50	3.00
4	CHARAN H S	MMA21454	10	10	20	10	10	20	3.00	3.00	3.00	3.00
5	INDUSHREE A	MMA21455	10	10	20	10	10	20	3.00	3.00	3.00	3.00
6	KAVYA C	MMA21456	0	5	5	5	5	10	0.00	1.50	1.50	1.50
7	KRUPA M H	MMA21457	10	10	20	10	10	20	3.00	3.00	3.00	3.00
8	MADIHA KHANUM	MMA21458	5	0	5	10	5	15	1.50	0.00	3.00	1.50
9	MEGHANA L	MMA21459	5	5	10	10	5	15	1.50	1.50	3.00	1.50
10	NEETHU C J	MMA21460	10	10	20	10	10	20	3.00	3.00	3.00	3.00
11	POOVAMMA M K	MMA21461	10	10	20	10	10	20	3.00	3.00	3.00	3.00
12	PRINCY INFANT MARY R	MMA21462	10	10	20	10	10	20	3.00	3.00	3.00	3.00
13	PRIYA UTHAPPA	MMA21463	0	0	0	10	10	20	0.00	0.00	3.00	3.00
14	RAKSHITHA M	MMA21464	10	10	20	10	10	20	3.00	3.00	3.00	3.00
15	ROJASHREE M R	MMA21465	10	10	20	10	10	20	3.00	3.00	3.00	3.00
16	SAHANA S	MMA21466	10	10	20	10	10	20	3.00	3.00	3.00	3.00
17	SANDHYA RANI	MMA21468	10	10	20	10	10	20	3.00	3.00	3.00	3.00
18	SANJANA MONDAL	MMA21469	10	10	20	10	10	20	3.00	3.00	3.00	3.00
19	SHALINI K	MMA21470	10	10	20	10	10	20	3.00	3.00	3.00	3.00
20	SHALINI S	MMA21471	5	10	15	10	5	15	1.50	3.00	3.00	1.50
21	SHALOM P	MMA21472	10	10	20	10	5	15	3.00	3.00	3.00	1.50
22	SHIVANI B	MMA21473	10	10	20	10	10	20	3.00	3.00	3.00	3.00
23	SHRIDHU M K	MMA21474	10	10	20	10	10	20	3.00	3.00	3.00	3.00
24	STEPHEN MATHEW	MMA21475	10	10	20	10	10	20	3.00	3.00	3.00	3.00
25	SUPREETHA G S	MMA21476	10	5	15	5	10	15	3.00	1.50	1.50	3.00
26	YASHASWINI	MMA21477	10	10	20	10	10	20	3.00	3.00	3.00	3.00
			CO1	CO2		CO3	CO4					
		Attempts	26	26		26	26					
		Above 40%	23	24		26	26					
		% Attainment	88.46	92.31		100	100					

**Table -5 DIRECT METHOD
CALCULATION OF CO ATTAINMENT OF THE COMPONENT OF FORMATIVE ASSESSMENT – C3
(Summative Component– C3)**

P.G. DEPARTMENT OF MATHEMATICS											
Course		MMT20A10	Title of the Course :		GROUP THEORY		QP Code: 87121				
Name of the Course Instructor :			XXXXX								
Sl. No	Name of the Candidate	Roll No	C3 END EXAM 70 MARKS				TOTAL (70)	ATTAINMENT			
			CO1 (17M)	CO2 (18M)	CO3 (17M)	CO4 (18M)		CO1 (17M)	CO2 (18M)	CO3 (17M)	CO4 (18M)
1	ANUSHA B R	MMA21451	7	8	7	4	26	1.24	1.30	0.71	0.67
2	ANUSHA C	MMA21452	11	9	9	9	38	1.94	1.50	1.59	1.50
3	CHANDANA VEENA S	MMA21453	1	9	10	7	27	0.18	1.50	1.24	1.17
4	CHARAN H S	MMA21454	9	4	4	8	25	1.59	0.70	1.41	1.33
5	INDUSHREE A	MMA21455	1	9	11	8	29	0.18	1.50	1.41	1.33
6	KAVYA C	MMA21456	9	13	4	9	35	1.59	2.20	1.59	1.50
7	KRUPA M H	MMA21457	9	8	11	12	40	1.59	1.30	2.12	2.00
8	MADIHA KHANUM	MMA21458	2	10	11	11	34	0.35	1.70	1.94	1.83
9	MEGHANA L	MMA21459	10	4	3	9	26	1.76	0.70	1.59	1.50
10	NEETHU C J	MMA21460	3	10	16	16	45	0.53	1.70	2.82	2.67
11	POOVAMMA M K	MMA21461	11	11	12	12	46	1.94	1.80	2.12	2.00
12	PRINCY INFANT MARY R	MMA21462	9	11	11	12	43	1.59	1.80	2.12	2.00
13	PRIYA UTHAPPA	MMA21463	9	10	11	10	40	1.59	1.70	1.76	1.67
14	RAKSHITHA M	MMA21464	8	0	4	4	16	1.41	0.00	0.71	0.67
15	ROJASHREE M R	MMA21465	9	8	9	2	28	1.59	1.30	0.35	0.33
16	SAHANA S	MMA21466	9	9	10	15	43	1.59	1.50	2.65	2.50
17	SANDHYA RANI	MMA21468	12	12	14	12	50	2.12	2.00	2.12	2.00
18	SANJANA MONDAL	MMA21469	11	11	11	15	48	1.94	1.80	2.65	2.50
19	SHALINI K	MMA21470	12	9	9	14	44	2.12	1.50	2.47	2.33
20	SHALINI S	MMA21471	9	9	7	0	25	1.59	1.50	0.00	0.00
21	SHALOM P	MMA21472	9	9	9	2	29	1.59	1.50	0.35	0.33
22	SHIVANI B	MMA21473	9	9	10	8	36	1.59	1.50	1.41	1.33
23	SHRIDHU M K	MMA21474	9	9	9	8	35	1.59	1.50	1.41	1.33
24	STEPHEN MATHEW	MMA21475	10	10	9	8	37	1.76	1.70	1.41	1.33
25	SUPREETHA G S	MMA21476	7	5	6	8	26	1.24	0.80	1.41	1.33
26	YASHASWINI	MMA21477	9	9	9	6	33	1.59	1.50	1.06	1.00
			CO1	CO2	CO3	CO4					
		Attempts	26	26	26	26					
		Above 40%	22	22	21	19					
		% Attainment	84.62	84.62	80.77	73.08					
		Attainment on a 3.00 point Scale	2.54	2.54	2.42	2.19					

Table -6 DIRECT & INDIRECT METHOD															
CALCULATION OF OVERALL CO ATTAINMENT OF THE MATHEMATICS PROGRAMME															
P.G. DEPARTMENT OF MATHEMATICS															
Course Code:		MMT20A101		Title of the Course :				GROUP THEORY				QP Code: 87121			
Name of the Course Instructor: XXXXX															
				ATTAINMENT											
Sl. No	Name of the Candidate	Roll No	DIRECT ATTAINMENT				Course exit survey on 4 Point Scale				INDIRECT ATTAINMENT				ATN
			CO1	CO2	CO3	CO4	CO1	CO2	CO3	CO4	CO1	CO2	CO3	CO4	
1	ANUSHA B R	MMA21451	1.53	1.90	2.08	1.72	4	3	3	1	3.00	2.25	2.25	0.75	1.90
2	ANUSHA C	MMA21452	2.63	2.42	2.37	2.39	4	4	4	3	3.00	3.00	3.00	2.25	2.50
3	CHANDANA VEENA S	MMA21453	1.84	2.16	1.74	2.24	2	3	2	3	1.50	2.25	1.50	2.25	2.00
4	CHARAN H S	MMA21454	2.42	2.01	2.23	2.13	3	3	4	3	2.25	2.25	3.00	2.25	2.20
5	INDUSHREE A	MMA21455	1.86	2.24	2.05	2.29	3	3	3	4	2.25	2.25	2.25	3.00	2.20
6	KAVYA C	MMA21456	1.66	2.04	1.87	1.74	2	3	3	2	1.50	2.25	2.25	1.50	1.80
7	KRUPA M H	MMA21457	2.37	2.24	2.47	2.39	3	3	4	3	2.25	2.25	3.00	2.25	2.40
8	MADIHA KHANUM	MMA21458	1.73	1.89	2.45	2.05	3	4	2	3	2.25	3.00	1.50	2.25	2.10
9	MEGHANA L	MMA21459	2.13	1.80	2.34	2.00	3	3	4	2	2.25	2.25	3.00	1.50	2.10
10	NEETHU C J	MMA21460	2.08	2.39	2.66	2.59	3	4	3	2	2.25	3.00	2.25	1.50	2.40
11	POOVAMMA M K	MMA21461	2.66	2.62	2.47	2.65	3	3	4	4	2.25	2.25	3.00	3.00	2.60
12	PRINCY INFANT MARY R	MMA21462	2.50	2.49	2.63	2.62	4	4	4	3	3.00	3.00	3.00	2.25	2.60
13	PRIYA UTHAPPA	MMA21463	1.84	1.76	2.52	2.39	3	3	2	4	2.25	2.25	1.50	3.00	2.20
14	RAKSHITHA M	MMA21464	2.23	1.65	2.02	1.88	4	2	2	3	3.00	1.50	1.50	2.25	2.00
15	ROJASHREE M R	MMA21465	2.42	2.45	2.02	2.04	4	3	3	3	3.00	2.25	2.25	2.25	2.30
16	SAHANA S	MMA21466	2.47	2.45	2.87	2.82	4	2	3	3	3.00	1.50	2.25	2.25	2.60
17	SANDHYA RANI	MMA21468	2.53	2.52	2.60	2.44	3	4	3	4	2.25	3.00	2.25	3.00	2.50
18	SANJANA MONDAL	MMA21469	2.52	2.62	2.66	2.64	3	4	4	4	2.25	3.00	3.00	3.00	2.70
19	SHALINI K	MMA21470	2.68	2.50	2.74	2.43	4	4	4	4	3.00	3.00	3.00	3.00	2.70
20	SHALINI S	MMA21471	2.13	2.29	1.71	1.71	4	3	2	3	3.00	2.25	1.50	2.25	2.00
21	SHALOM P	MMA21472	2.42	2.52	2.02	1.60	4	3	4	3	3.00	2.25	3.00	2.25	2.20
22	SHIVANI B	MMA21473	2.55	2.52	2.23	2.37	3	4	3	4	2.25	3.00	3.00	3.00	2.50
23	SHRIDHU M K	MMA21474	2.29	2.26	2.13	2.13	3	4	3	4	2.25	3.00	2.25	3.00	2.30
24	STEPHEN MATHEW	MMA21475	2.45	2.60	2.29	2.45	3	4	4	3	2.25	3.00	3.00	2.25	2.50
25	SUPREETHA G S	MMA21476	2.31	1.93	2.13	2.24	4	3	3	4	3.00	2.25	2.25	3.00	2.20
26	YASHASWINI	MMA21477	2.34	2.34	2.16	2.24	4	3	3	4	3.00	2.25	2.25	3.00	2.30
							2.51	2.48	2.39	2.39	2.51	2.48	2.39	2.39	2.51
							OVERALL INDIRECT ATTAINMENT ON A 3-POINT SCALE								
							CO1	CO2	CO3	CO4					
			Average:				2.51	2.48	2.39	2.39					

Table -7 (CO- ATTAINMENT) COs DIRECT ATTAINMENT SUMMARY							
P.G. DEPARTMENT OF MATHEMATICS							
Title of the Course: GROUP THEORY			Course Code:		MMT20A10	Q P Code: 87121	
COs Attainment Summary							
IA (Formative/CCA) C1& C2						Summative C3	
COs	Test	Assignment	Seminar	Quiz	Average	C3	*CO Attainment
CO1	3.00	3.00	3.00	2.65	2.91	2.54	2.80
CO2	2.88	3.00	3.00	2.77	2.91	2.54	2.80
CO3	3.00	2.88	3.00	3.00	2.97	2.42	2.81
CO4	2.88	3.00	3.00	3.00	2.97	2.19	2.74
*FORMULA : (70% OF FORMATIVE ASSESMENT ATTAINMENT)+(30% OF SUMMATIVE) ATTAINMENT)							
		COs	DIRECT	INDIRECT	**OVERALL		
		CO1	2.80	2.33	2.71		
		CO2	2.80	2.33	2.71		
		CO3	2.81	2.34	2.71		
		CO4	2.74	2.28	2.65		
AVERAGE CO ATTAINMENT				2.69 Out of the maximum attainment of 3. ** FORMULA : (80% Direct)+(20% indirect)			

15.0

ASSESSMENT PROCESS FOR PO AND PSO ATTAINMENT:

- POs, defined by Accreditation Agencies encapsulate statements about the knowledge, skills, attitudes, and graduate attributes within a Programme. Programme Outcomes manifest graduates' ability to apply knowledge in Basic Sciences, Humanities, Social Sciences, and Commerce and Management, demonstrating proficiency in professional core subjects, electives, and projects. Graduates are expected to adhere to professional and ethical responsibilities for societal benefit, facilitating further studies and engagement in research development
- Programme Specific Outcomes specify the actions and capabilities expected from graduates of a specific Programme
- At the UG level for Basic Sciences & Humanities Programmes, having courses offered from different departments, the POs may be treated as common but the PSOs are to be that of the course offered by the relevant department.

- The course instructor should map the COs with the relevant POs based on existing correlation relationships for the course he/she is in charge of. All the courses of the programmes are to be mapped. It is important to note that while each PO may not necessarily map to a specific CO, all POs must be mapped to at least one of the specified PSOs, as depicted in the following table.

➤ **Note:**

To explain the **PO & PSO** attainment calculations, the PG Mathematics Programme is taken as a model.

CO-PO MAPPING – PREDEFINED TARGETS (EXPECTED / ANTICIPATED) VALUES)

PO & PSO Assessment Process

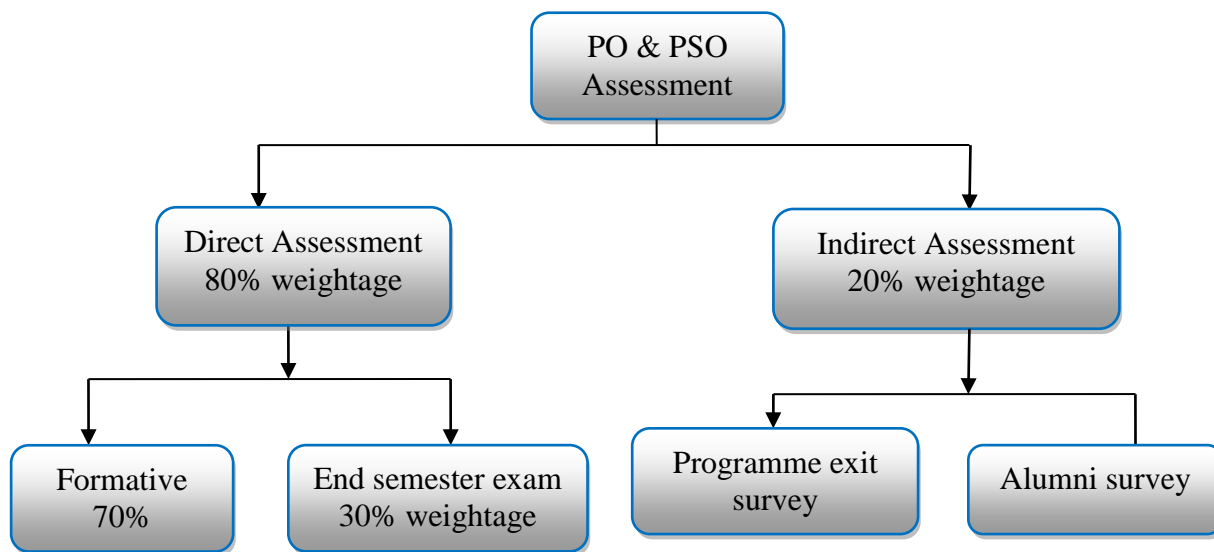


Table -8 CO-PO/PSO MATRIX /MAPPING			
The Predefined Target Attainment (Anticipated/ Expected) of CO with PO/PSO is Correlation and mapped as per the following table.			
The different correlation levels are as follows			
Correlation Level		Predefined Targets Attainment Correlation of CO with PO/PSO	Attainment weightage Percentage
1	:	Signifies Slight (Low) Correlation	40.00 to 50.00
2	:	Signifies Moderate (Medium)	50.00 to 70.00
3	:	Signifies Substantial (High) Correlation	Above 75.00

16.0 THE MAPPING OF POS AND PSOS WITH RELEVANT COURSE OUTCOMES.

The course instructor should map the COs with the relevant POs based on existing correlation relationships for the course he/she is in charge of. All the courses of the programmes are to be mapped. It is important to note that while each PO may not necessarily map to a specific CO, all POs must be mapped to at least one of the specified PSOs, as depicted in the following table.

Step-1: CO-PO/PSO MATRIX /MAPPING

Table - 9 (Mapping of COs with POs & PSOs)			
P.G. DEPARTMENT OF MATHEMATICS			
Title of the Course: GROUP THEORY			
COURSE INSTRUCTOR: XXXX			
Sl. No	COURSE OUTCOME	PO's	PSO's
1	Understand the properties of the algebraic structure with one binary operation	1,3,4,5	1,3,5
2	Describe Normal groups and quotient groups.	1,3,4	1,2,4
3	Analyse Permutation groups and the Counting principle.	1,4,5,7	1,2,3,4
4	Explain Sylow theorem and its applications	1,3,4,5,6,12	1,3,4,5

Step 2: Mapping of Predefined Target Attainment of COs with the relevant POs/PSOs based on the above correlation weightage levels as per the above CO-PO/PSO matrix. The sample table of the mathematics programme is shown below

Note: If the PO attainment correlation level is low, that is between 40% & 50 %, then to be marked as 1, moderate to be marked as 2 & high to be marked as 3.

Table-10 CO-PO/PSO- Predefined Matrix PREDEFINED TARGET ATTAINMENT CO-PO/PSO MAPPING CORRELATION WEIGHTAGE MATRIX																	
COs	PROGRAM OUTCOMES (POs)												PROGRAM SPECIFIC OUTCOMES (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2		2	3	2								3		3		1
CO2	2		2	3									1	2		2	
CO3	1			3	2		2						1	1	3	1	
CO4	2		2	2	1	2	2					2	1		3	1	1
Predefined Average	1.75		2	2.75	1.67	2	2					2	1.5	1.5	3	1.33	1

Step-3: Mapping the COs & PSOs with the CO weightage attained from the formative, summative evaluation (70% of direct method) and the course exit survey (20% of indirect method). Referring to Table -7, the average CO attainment value of -2.69 is to be mapped with POs & PSOs. 2.69 to be distributed for levels 1, 2 & 3 as For level 1 = $2.69 \times \frac{1}{3}$ For level 2 = $2.69 \times \frac{2}{3}$. For level 3 = $2.69 \times \frac{3}{3}$.

Table - 11 (CO-PO/PSO(Direct Attainment Matrix) DIRECT ATTAINMENT CO-PO/PSO MAPPING CORRELATION WEIGHTAGE MATRIX- DIRECT																	
COs	PROGRAMME OUTCOMES (POs)												PROGRAMME SPECIFIC OUTCOMES (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1.80		1.80	2.69	1.80								2.69		2.69		0.90
CO2	1.80		1.80	2.69									0.90	1.80		1.80	
CO3	0.90			2.69	1.80		1.80						0.90	0.90	2.69	0.90	
CO4	1.80		1.80	1.80	0.90	1.80	1.80					1.80	0.90		2.69	0.90	0.90
Attained Average	1.57		1.80	2.47	1.50	1.80	1.80					1.80	1.35	1.35	2.69	1.20	0.90

Step-4: Gap Analysis: The difference between predefined average values (Table-10) and attained average values (Table-11) gives the gap. The remedial measures are to be adopted to fill the gap for the incoming batches.

Table-12 GAP ANALYSIS																	
POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
Table-10	1.75		2.00	2.75	1.67	2.00	2.00					2.00	1.50	1.50	3.00	1.33	1.00
Table-11	1.57		1.80	2.47	1.50	1.80	1.80					1.80	1.35	1.35	2.69	1.20	0.90
GAP	0.18		0.20	0.28	0.17	0.20	0.20					0.20	0.15	0.15	0.31	0.14	0.10

Step -5. The above 1- 4 steps for the Group Theory course are repeated for all the remaining courses of the Programme. The attainment of COs, POs & PSOs are to be calculated for each course for all the semesters. The course-wise values are summarized in the tables as shown below.

Table-13 ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURE- 15.																			
P.G. DEPARTMENT OF MATHEMATICS																			
PREDEFINED TARGET (EXPECTED/ANTICIPATED) ATTAINMENT, CO-PO/PSO MAPPING CORRELATION WEIGHTAGE MATRIX, FOR THE BATCH 2021-23																			
Semester	Course Code	Title of the Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
First	MMA20A101	Group Theory	1.75		2.00	2.75	1.67	2.00	2.00					2.00	1.50	1.50	3.00	1.33	1.00
	MMA20A102	Real Analysis - I	1.67	2.00	1.75	2.25	1.50	2.50	1.67					1.67	2.25	2.33		2.00	1.25
	MMA20A103	Real Analysis - II	1.50		2.00	2.00	2.00	2.00	2.00					1.00	2.50	2.00	2.50	2.33	2.00
	MMA20A104	Introduction to Complex Analysis	2.00		2.50	2.33	2.00	1.50	2.00		2.50			2.00	2.00	1.67	2.50	2.50	1.67
	MMA20A205	Linear Algebra with Applications	1.67	2.00	1.50	2.75	1.33	2.50	1.67					1.50	1.50	1.50	2.75	1.50	1.00
Second	MMA20B111	Ring and Field Theory	1.50	1.50	2.00	2.50	2.00	2.00	2.00					1.67	2.25	2.00	2.33	1.50	2.00
	MMA20B112	Real Analysis - III	1.25		2.50	2.50	1.75	2.00	1.33		2.00			1.75	2.50	1.75	1.00	2.25	1.75
	MMA20B113	Advanced Complex Analysis	2.00		2.00	1.67	2.00	2.50	2.00		1.50			2.33	1.67	2.00	3.00	2.25	1.50
	MMA20B416	Ordinary and Partial Differential Equations	1.67	2.00	1.75	2.25	1.50	2.50	1.67					1.67	2.25	2.33		2.00	1.25
	MMA20B619	Latex - Type Setting		2.33	1.50		2.00	2.50	1.50	1.50	2.33	1.50	1.50	2.33	1.67	2.00		2.33	2.33
	MMA20B517	Numerical Computation In Science - I	1.50	2.00	1.00	2.50	1.50	1.50	1.50		1.67			1.50	2.25	1.33	1.00	2.33	2.00
Third	MMA20C131	Elements of Functional Analysis	1.25	2.00	2.00	2.33	1.67	2.50	1.67		2.00			1.00	1.67	1.75	2.00	2.33	1.00
	MMA20C132	Topology - I	2.00	2.00	2.00	1.33	2.75	2.00	2.00					1.50	1.33	1.75	2.75	2.00	2.00
	MMA20C233	Theory of Numbers	1.75		2.00	2.75	2.00	2.75	1.50		2.00			2.25	2.50	2.00	2.00	2.25	2.00
	MMA20C234	Graph Theory	2.00	1.00	2.50	2.50	2.75	2.75	2.00	1.50	2.75			1.00	2.50	2.33	2.50	2.50	2.50
	MMA20C337	Literature Survey	2.33	2.50	1.50	3.00	1.33	1.75	2.50	2.50	2.33	2.50	2.00	2.50	2.00	1.33	2.00	2.50	2.50
Fourth	MMA20D151	Measure and Integration	2.00	2.00	2.00	1.50	2.00	2.50	2.50		2.25			1.50	1.67	2.00	2.50	2.00	2.00
	MMA20D152	Topology-II	1.67	1.00	2.00	1.67	2.50	2.00	2.33					1.50	1.67	2.33	2.50	2.00	1.00
	MMA20D253	Theory of Partitions	1.75		2.00	2.50	2.00	2.50	1.50		2.00			2.25	2.50	2.00	2.00	2.25	2.00
	MMA20D355	Transforms and Calculus of Variations	1.67	1.50	1.75	2.67	2.00	2.00	2.00					1.33	1.75	2.25	0.00	2.00	2.00
	MMA20D456	Project Work	2.00	2.00	2.00	1.67	1.75	3.00	1.75	2.00	2.00	2.00		1.50	2.50	2.00	2.00	3.00	2.67
	MMA20D557	Numerical Computation in Science - II	1.50	2.00	1.00	2.50	1.50	1.50	1.50		1.67			1.50	2.25	1.33	1.00	2.33	2.00
Predefined Average			1.73	1.86	1.88	2.28	1.89	2.22	1.84	1.88	2.08	2.00	1.75	1.69	2.03	1.89	2.07	2.16	1.78

Table-14 ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURE- 15. P.G. DEPARTMENT OF MATHEMATICS																				
ACTUAL PROGRAMME ATTAINMENT FOR THE BATCH 2021-23 (DIRECT METHOD)																				
Semester	Course Code	Title of the Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	
First	MMA20A101	Group Theory	1.57		1.80	2.47	1.50	1.80	1.80					1.80	1.35	1.35	2.69	1.20	0.90	
	MMA20A102	Real Analysis - I	1.54	1.84	1.61	2.07	1.38	2.30	1.54					1.54	2.07	2.15	0.00	1.84	1.15	
	MMA20A103	Real Analysis - II	1.34		1.78	1.78	1.78	1.78	1.78						0.89	2.23	1.78	2.23	2.08	1.78
	MMA20A104	Introduction to Complex Analysis	1.87		2.33	2.18	1.87	1.40	1.87			2.33			1.87	1.87	1.56	2.33	2.33	1.56
	MMA20A205	Linear Algebra with Applications	1.44	1.73	1.30	2.38	1.15	2.16	1.44						1.30	1.30	1.30	2.38	1.30	0.87
Second	MMA20B111	Ring and Field Theory	1.24	1.24	1.65	2.27	1.65	1.65	1.65					1.37	2.06	1.65	1.92	1.24	1.65	
	MMA20B112	Real Analysis - III	1.11		2.22	2.22	1.55	1.77	1.18		1.77			1.55	2.22	1.55	0.89	1.99	1.55	
	MMA20B113	Advanced Complex Analysis	1.71		1.71	1.42	1.71	2.13	1.71		1.28			1.99	1.42	1.71	2.56	1.92	1.28	
	MMA20B416	Ordinary and Partial Differential Equations	1.51	1.81	1.59	2.04	1.36	2.27	1.51					1.51	2.04	2.12		1.81	1.13	
	MMA20B619	Latex - Type Setting		2.25	1.45		1.93	2.41	1.45	1.45	2.25	1.45	1.45	2.25	1.61	1.93		2.25	2.25	
	MMA20B517	Numerical Computation in Science - I	1.26	1.68	0.84	2.10	1.26	1.26	1.26		1.40			1.26	1.89	1.12	0.84	1.96	1.68	
Third	MMA20C131	Elements of Functional Analysis	1.10	1.77	1.77	2.06	1.47	2.21	1.47		1.77			0.88	1.47	1.55	1.77	2.06	0.88	
	MMA20C132	Topology - I	1.77	1.77	1.77	1.18	2.44	1.77	1.77					1.33	1.18	1.55	2.44	1.77	1.77	
	MMA20C233	Theory of Numbers	1.63		1.87	2.57	1.87	2.57	1.40		1.87			2.10	2.33	1.87	1.87	2.10	1.87	
	MMA20C234	Graph Theory	1.82	0.91	2.28	2.28	2.51	2.51	1.82	1.37	2.51			0.91	2.28	2.13	2.28	2.28	2.28	
	MMA20C337	Literature Survey	2.26	2.42	1.45	2.90	1.29	1.69	2.42	2.42	2.26	2.42	1.93	2.42	1.93	1.29	1.93	1.93	2.42	2.26
Fourth	MMA20D151	Measure And Integration	1.88	1.88	1.88	1.41	1.88	2.34	2.34		2.11			1.41	1.56	1.88	2.34	1.88	1.88	
	MMA20D152	Topology-II	1.46	0.87	1.75	1.46	2.18	1.75	2.04					1.31	1.46	2.04	2.18	1.75	0.87	
	MMA20D253	Theory of Partitions	1.60		1.83	2.29	1.83	2.29	1.37		1.83			2.06	2.29	1.83	1.83	2.06	1.83	
	MMA20D355	Transforms and Calculus of Variations	1.53	1.38	1.61	2.45	1.84	1.84	1.84					1.22	1.61	2.07		1.84	1.84	
	MMA20D456	Project Work	1.93	1.93	1.93	1.61	1.69	2.90	1.69	1.93	1.93	1.93		1.45	2.42	1.93	1.93	2.90	2.58	
	MMA20D557	Numerical Computation in Science - II	1.42	1.89	0.94	2.36	1.42	1.42	1.42		1.57			1.42	2.12	1.26	0.94	2.20	1.89	
Attained/ Actual Average (100%)			1.57	1.69	1.70	2.07	1.71	2.01	1.67	1.79	1.91	1.93	1.69	1.54	1.85	1.71	1.86	1.96	1.62	
Attained/ Actual Average (80%)			1.26	1.35	1.36	1.66	1.37	1.61	1.34	1.43	1.53	1.55	1.35	1.23	1.48	1.37	1.49	1.57	1.30	

Table: 15 ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURU – 15. P.G. DEPARTMENT OF MATHEMATICS

Sl.No.	Name of the Student	PROGRAMME ATTAINMENTFROM GRADUATE EXIT SURVEY - BATCH 2021-23 (INDIRECT METHOD)																	
		Roll No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
1	Anusha B R	MMA21451	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4
2	Anusha	MMA21452	3	4	4	4	3	4	3	4	3	4	3	4	3	3	4	4	4
3	ChandanaVeena S	MMA21453	4	3	3	4	3	4	3	4	3	4	4	3	4	4	4	3	3
4	Charan H S	MMA21454	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	3	4
5	Indushree A	MMA21455	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
6	Kavya C	MMA21456	4	4	3	4	3	3	4	3	3	4	4	4	4	4	4	4	4
7	Krupa MH	MMA21457	3	3	3	3	3	3	3	3	4	4	4	3	4	4	4	4	4
8	MadihaKhanum	MMA21458	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	3	4
9	Meghana L	MMA21459	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
10	Neethu C J	MMA21460	4	4	3	3	3	3	3	3	3	4	3	4	4	4	3	4	4
11	Poovamma M K	MMA21461	4	4	3	4	3	4	3	3	3	4	4	4	4	3	4	3	4
12	Princy Infant Mary	MMA21462	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	3	4
13	PriyaUthappa	MMA21463	4	4	4	3	3	4	4	4	3	4	4	4	4	4	4	3	4
14	Rakshitha M	MMA21464	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	3	4
15	Rojashree M R	MMA21465	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
16	Sahana S	MMA21466	3	3	3	3	4	4	3	3	3	4	4	4	3	3	4	4	3
17	Sandhya Rani	MMA21468	3	3	3	3	3	2	4	4	3	4	4	3	3	4	4	3	3
18	SanjanaMondal	MMA21469	4	3	3	3	3	4	4	4	4	4	3	3	4	3	3	4	3
19	Shalini K	MMA21470	4	4	4	4	3	3	3	3	3	3	4	4	4	4	4	4	4
20	Shalini S	MMA21471	4	4	4	4	4	4	4	4	3	3	4	4	4	4	4	3	4
21	Shalom P	MMA21472	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
22	Shivani B	MMA21473	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	4
23	Shridhu M K	MMA21474	4	4	3	3	4	4	4	3	4	4	4	4	4	4	4	4	4
24	Stephen Mathew	MMA21475	3	4	3	4	3	3	4	3	3	4	3	4	4	4	4	4	4
25	Supreetha G S	MMA21476	4	4	3	4	4	4	4	4	3	4	4	4	4	4	4	3	4
26	Yashaswini	MMA21477	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	3	4
Average			3.77	3.77	3.42	3.65	3.5	3.65	3.69	4	3.5	3.88	3.81	3.81	3.85	3.77	3.88	3.5	3.81
Indirect Attn on 3 point scale			2.83	2.83	2.57	2.74	2.62	2.74	2.77	3	2.6	2.91	2.86	2.86	2.88	2.83	2.91	2.62	2.86

ST. PHILOMENA'S COLLEGE (AUTONOMOUS), MYSURU- 15

P.G. DEPARTMENT OF MATHEMATICS

OVERALL POs& PSOs ATTAINMENT FOR THE BATCH 2021-23

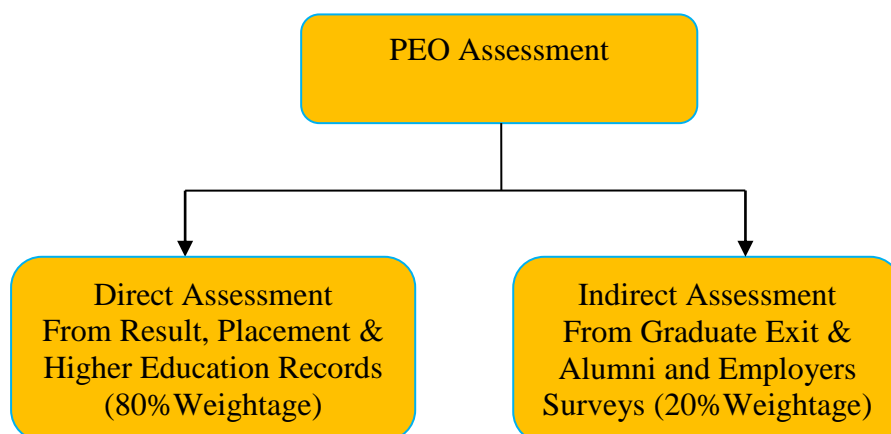
Table- 16 OVERALL PROGRAMME OUTCOMES & PROGRAMME SPECIFIC OUTCOMES ATTAINMENT FOR THE BATCH 2021-23

POs& PSOs ATTAINMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
PREDEFINED VALUE	1.73**	1.86	1.88	2.28	1.89	2.22	1.84	1.88	2.08	2.00	1.75	1.69	2.03	1.89	2.19	2.16	1.78
80% OF DIRECT	1.26	1.35	1.36	1.66	1.37	1.61	1.34	1.43	1.53	1.55	1.35	1.23	1.48	1.37	1.57	1.57	1.30
EXIT SURVEY	2.83*	2.83	2.56	2.72	2.61	2.75	2.75	2.75	2.61	2.89	2.86	2.83	2.89	2.81	2.92	2.61	2.86
20 % OF EXIT SURVEY SCALED UP TO PREDEFINED VALUE	0.33^a	0.35	0.32	0.41	0.33	0.41	0.34	0.34	0.36	0.39	0.33	0.32	0.39	0.35	0.42	0.38	0.34
OVERALL	1.58^a	1.70	1.68	2.07	1.69	2.01	1.68	1.78	1.89	1.93	1.69	1.55	1.87	1.72	2.00	1.95	1.64
GAP	0.15	0.15	0.20	0.21	0.19	0.20	0.17	0.10	0.18	0.07	0.06	0.14	0.16	0.17	0.19	0.21	0.14
$Formula = x = \frac{Exit Survey}{3} \times Predefined Value \times 0.2$									$Example^a Formula = x = \frac{2.83^*}{3} \times 1.73^{**} \times 0.2 = 0.236 = 0.33^a$								

17 PROGRAMMEME EDUCATIONAL OBJECTIVES (PEOs)

Programme Educational Objectives (PEOs) are broad statements that describe the career and professional accomplishments that the Programme is preparing the graduates to achieve. PEOs are measured around 4-5 years after graduation.

The attainment of Programme Educational Objectives (PEOs) is accomplished through the following instructional activities Tools:



The Assessment **Criteria** for PEOs

Type of Assessment Tools	Assessment Tool	Assessment Criteria	Data Collection Frequency	Responsible Department	Indicator PEOs attainment
Direct	Result	From the overall PO attainment data	Once after the announcement final year result	Examination Cell	PEOs 1-5
	Higher Education	Percentage of students taking higher education	Once a year for three years after completion of the Programme	Department	PEOs 1-5
	Placement	Percentage of students placed	Once a year for seven years after completion of the Programme	Placement Cell	PEOs 1-5
Indirect	Graduate Exit Survey	Level of achievement	Once a year the end of the Programme	Department	PEOs 1-5
	Alumni Survey	Level of achievement	Once a year for three years after completion of the Programme	Department	PEOs 1-5
	Employer Surveys	Level of achievement	Once a year for seven years after completion of the Programme	Department	PEOs 1-5

Table- 17 PEOs EVALUATION PROCESS AND ANALYSIS
THE FINAL PEOs ATTAINMENT OF A PROGRAMME IS ASSESSED FROM THE FOLLOWING DATA

NAME OF THE PROGRAMME:.....		
Sl. No	Name of the evaluation Criterion	Weightage in %
Direct Assessment 90%		
1.	Direct Evaluation of the POs of the concern PEO	70
2.	Higher Studies	05
3.	Placements	15
Indirect assessment 10%		
4.	Graduate Exit Survey/ Alumni Survey/ Employer Survey	10
Total		100

The attainment of the PEOs
The Expected Level of Attainment for each of the Program Educational Objectives

Table -18 Levels of Attainment for each PEO

PEO	Level of Attainment
Attainment Value 70% and above	Excellent
Attainment Value between 60 and 69.9%	Very Good
Attainment Value between 50 and 59.9%	Good
Attainment Value between 40 and 50%	Satisfactory
Attainment Value less than 40%	Not Satisfactory

Table - 19 The calculation of attainment of Programme Educational Objectives (PEOs)
P.G. DEPARTMENT OF MATHEMATICS
Mapping of PEOs with POs & PSOs

PEO. No.	Programme Educational Objectives (PEOs)	PO's	PSO's
	PROFESSIONAL GROWTH		
PEO-1	Keep on discovering new avenues in the chosen field and exploring areas that remain Conducive to research and development.	1,2,3,4,5,6,7	1,2,3,4
	CORE PROFICIENCY		
PEO-2	To expertise the students to organize, understand, evaluate, and solve problems by providing hands-on experience through modern tools necessary for practice.	1,2,3,5,6,7,12	1,2,3
	TECHNICAL PROFICIENCY		
PEO-3	To have the interdisciplinary knowledge and relate them to the technical aspect as the impact of the subject concerned is very wide.	3,6,7,8,11	1,4
	MANAGEMENT SKILLS		
PEO-4	Encourage personality development skills like time management, crisis management, Stress interviews, and working as a team.	4, 7,9,12	1,4,5
	LEARNING ENVIRONMENT		
PEO-5	To provide students with knowledge and capability in formulating and analysis of mathematical models of real-life applications.	3,8,9,10	1,3,4,5

**Table -20 PEO -PO/PSO - Matrix
PREDEFINED TARGET ATTAINMENT
PEO-PO/PSO MAPPING CORRELATION WEIGHTAGE MATRIX**

PEOs	PROGRAM OUTCOMES (POs)												PROGRAM SPECIFIC OUTCOMES (PSOs)					AVG
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	
PEO1	3 ^b	2	2	3	2	2	2						3	2	2	2		2.27
PEO2	2	3	2	3	3	2	1					2	2	2	2			2.18
PEO3			2			2	2	3			3		2			3		2.43
PEO4				2			2		2			2	2			2	3	2.14
PEO5			3					2	1	3		2	1		3	1	2	2.00
PREDEFINED AVERAGE	2.5	2.5	2.25	2.67	2.5	2	1.75	2.5	1.5	3	3	2	2	2	2.33	2	2.5	2.29

**Table-21 PEO-PO/PSO - Matrix
ATTAINMENT FOR THE BATCH 2021-23
PEO-PO/PSO MAPPING CORRELATION WEIGHTAGE MATRIX**

PEOs	PROGRAM OUTCOMES (POs)												PROGRAM SPECIFIC OUTCOMES (PSOs)					AVG
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	
PEO1	2.74 ^d	1.84	1.79	2.72	1.80	1.82	1.82						2.76	1.82	1.83	1.80		2.07
PEO2	1.83	2.75	1.79	2.72	2.69	1.82	0.91					1.83	1.84	1.82	1.83			1.98
PEO3			1.79			1.82	1.82	2.84			2.89		1.84			2.70		2.24
PEO4				1.82			1.82		1.82			1.83	1.84			1.80	2.76	1.96
PEO5			2.68					1.89	0.91	2.90		1.83	0.92		2.74	0.90	1.84	1.85
ACTUAL ATTAINED AVERAGE	2.28	2.30	2.01	2.42	2.24	1.82	1.59	2.37	1.37	2.90	2.89	1.83	1.84	1.82	2.13	1.80	2.30	2.11

Calculation of PEO1 = Overall Attainment of PO1^a (Table 16) X Predefined Target Attainment of value of PO1^b (Table 20) / Predefined value of PO1^c (Table 16)

$$\text{Example } ^d = (1.58 * 3) / 1.73 = 2.74$$

**Table-22
CALCULATION OF AVERAGE VALUES OF PEOs ATTAINMENT FROM
PEO-PO/PSO MAPPING CORRELATION WEIGHTAGE MATRIX
ATTAINMENT FOR THE BATCH 2021-23**

PEOs	Predefined Value	Actual Attained Value	Percentage (100%)	Percentage (70%)
PEO1	2.27	2.07		
PEO2	2.18	1.98		
PEO3	2.43	2.24		
PEO4	2.14	1.96		
PEO5	2	1.85		
EXPECTED AVERAGE	2.19	2.02		

Table- 23

**PEO EVALUATION PROCESS AND ANALYSIS
ATTAINMENT FOR THE BATCH 2021-23**

**THE FINAL PEOs ATTAINMENT OF A PROGRAMME IS ASSESSED FROM
THE FOLLOWING DATA**

NAME OF THE PROGRAMME: M.Sc., MATHEMATICS			
Sl. No	NAME OF THE EVALUATION CRITERION		Weightage in %
Direct Assessment 90%			
1	Final Attainment of PEOs	$91.65 = \alpha$	70% of $\alpha=64.15$
2	Higher Studies/ Professional Programmes	$35.29 = \beta$	05% of $\beta = 1.76$
3	Placements	$45 = \gamma$	15% of $\gamma = 6.75$
Indirect assessment 10%			
4	Graduate Exit Survey/ Alumni Survey/ Employer Survey	δ (to be collected)	-
TOTAL			$\alpha + \beta + \gamma = 72.66$
Level of Attainment			Excellent

Note: The attainment of PEOs β , γ & δ increases as more number of students get placement. The β , γ & δ values are updated every year till 7 years after the completion of the programme to reach the full attainment

Course Outcomes (COs) feedback Survey

ST. PHILOMENA'S COLLEGE AUTONOMOUS, MYSORE
Post Graduate Studies and Research Centre

Format to collect Course Outcomes (COs) feedback Survey from students at the end of each semester (Write the name of the Programme)

Batch – (Write the Batch Number. Eg: 2020-22)

Subject: Invitation to participate in (Write the name of the Programme) Curriculum Feedback Survey

Dear [Recipient's Name],

I hope this letter finds you well. As part of our ongoing commitment to academic excellence and continuous improvement, we are seeking your valuable feedback on the (Write the name of the Programme) programme offered at our esteemed institution. Your insights will play a crucial role in evaluating the effectiveness of the curriculum in meeting the Course Outcomes or Learning Outcomes (COs),

We believe that your experiences and perspectives as a student in the (Write the name of the Programme) programmes are invaluable in shaping the future of our academic offerings. Your candid feedback will assist us in identifying strengths and areas for enhancement, ensuring that we provide the best possible education to our students. We request you to spare 5-10 minutes for the completion of this questionnaire and we greatly appreciate your effort for the right cause. Please indicate the level of attainment of the course outcomes of all the courses in your semester on a scale from 1 to 4

Survey- Questionnaires Rating Weightage

Attainment of COs	Rating	Rating Weightage
Very High	Excellent	4
High	Very Good	3
Moderate	Good	2
Low	Average	1

Sl. No.	Parameter / Course Codes						
1	Course outcomes were delineated.						
2	The educational journey within the course facilitates the attainment of its objectives through lectures, tutorials, laboratories, case studies, surveys, projects, etc.						
3	The instructional materials provided in the course aid in reaching the course outcomes, including lecture notes, PowerPoint presentations, and online resources.						
4	The effectiveness of teaching within the course contributes to achieving the desired outcomes.						
5	The instructional approach employed in the course was suitable for accomplishing the designated outcomes.						
6	Are you inclined towards achieving the course outcomes? (Demonstrating eagerness and commitment to learning, completing tasks, and pursuing objectives willingly.)						
7	Please rate your overall satisfaction with the course						

We genuinely appreciate your time and commitment to ensuring the continual enhancement of our academic programs. Your input is instrumental in maintaining the high standards of education that our institution strives to deliver.

If you encounter any issues or have questions regarding the survey, please feel free to contact [Insert Contact Information].

Thank you once again for your participation and dedication to the ongoing improvement of our academic offerings.

Student's Information (Optional)			
Reg. No.:		Name:	
		Email ID:	

Warm regards,

Sincerely,

Head of the Department

**Program Outcomes (POs) and Program Specific Outcomes (PSOs) feedback survey
from Alumni Members**

ST. PHILOMENA'S COLLEGE AUTONOMOUS, MYSORE

Post Graduate Studies and Research Centre

**Format to collect Program Outcomes (POs) and Program Specific Outcomes (PSOs) feedback
survey from Alumni Members of the (Write the name of the Programme)**

Batch – (Write the Batch Number. Eg: 2020-22)

**Subject: Invitation to participate in (Write the name of the Programme) Curriculum
Feedback Survey**

Dear [Recipient's Name],

I hope this letter finds you well. As part of our ongoing commitment to academic excellence and continuous improvement, we are seeking your valuable feedback on the (Write the name of the Programme) programmes offered at our esteemed institution. Your insights will play a crucial role in evaluating the effectiveness of the curriculum in meeting the Program Outcomes (POs), and Program Specific Outcomes (PSOs).

We believe that your experiences and perspectives as a student in the (Write the name of the Programme) programmes are invaluable in shaping the future of our academic offerings. Your candid feedback will assist us in identifying strengths and areas for enhancement, ensuring that we provide the best possible education to our students. We request you to spare 5-10 minutes for the completion of this questionnaire and we greatly appreciate your effort for the right cause. Answer/ rate them by quantifying them in 4 scales with a $\sqrt{\quad}$ mark.

Survey- Questionnaires Rating Weightage

Attainment of POs	Rating	Rating Weightage
Very well accomplished	Excellent	4
Well accomplished	Very Good	3
Moderately accomplished	Good	2
Poorly accomplished	Average	1

Sl. No	Program Outcomes (POs) <i>Note: The sample given below is from M.Sc., Mathematics Department. These are to be replaced with the respective Departmental POs.</i>	POs	Rating Weightage (√)			
			Excellent	Very Good	Good	Average
			4	3	2	1
1.	How do you rate the Disciplinary Knowledge obtained during the program period?	PO1				
2.	How do you rate the program related to Communication Skills ?	PO2				
3.	How do you assess the program in connection with Critical Thinking ?	PO3				
4.	Is the curriculum useful in Problem-solving ?	PO4				
5.	How much did this program help in applying Analytical Reasoning ?	PO5				
6.	How do you rate your impact on Research-Related Skills ?	PO6				
7.	How does this program help in Cooperation/Team Work ?	PO7				
8.	Were you able to apply Scientific reasoning ?	PO8				
9.	Did you have the opportunity in terms of Self-Directed Learning ?	PO9				
10.	How do you rate the impact of Moral and ethical awareness in the program?	PO10				
11.	Were you able to manage Leadership Readiness Aspects effectively in your work environment?	PO11				
12.	How far is this program directed in lifelong learning ?	PO12				
Sl. No	Program Specific Outcomes (PSOs) <i>Note: The sample given below is from M.Sc., Mathematics Department. These are to be replaced with the respective Departmental PSOs.</i>	PSOs	Rating Weightage (√)			
			Excellent	Very Good	Good	Average
			4	3	2	1
1.	How do you rate the independent problem-solving skills and their application to both pure and applied mathematical challenges studied during your two-year M.Sc., Mathematics Programme were helpful to you in your career	PSO1				
2.	Were you able to apply the ability to analyze intricate mathematical ideas and arguments, leading to improved learning and performance in your present position as an employee in any organizations	PSO2				
3.	To what extent fostering the development of abstract mathematical thinking knowledge useful in your carrier	PSO3				
4.	To what extent you were able to utilize mathematical concepts adeptly in interdisciplinary fields in your present carrier	PSO4				

5.	To what extent you were confident in employing mathematical software and tools to address complex mathematical problems and conduct scientific investigations, while actively pursuing research in challenging areas of both pure and applied mathematics?	PSO5				
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We genuinely appreciate your time and commitment to ensuring the continual enhancement of our academic programs. Your input is instrumental in maintaining the high standards of education that our institution strives to deliver.

If you encounter any issues or have questions regarding the survey, please feel free to contact [Insert Contact Information].

Thank you once again for your participation and dedication to the ongoing improvement of our academic offerings.

Warm regards,

[Your Full Name]

[Your Title/Position]

[Institution Name]

Educational Outcomes (PEOs), **feedback Survey from Alumni Members**

ST. PHILOMENA'S COLLEGE AUTONOMOUS, MYSORE

Post Graduate Studies and Research Centre

Format to collect Program Educational Outcomes (PEOs), feedback Survey from Alumni Members of the (Write the name of the Programme)

Batch - (Write the batch. Eg: 2020-22)

Subject: Invitation to participate in (Write the name of the Programme) Curriculum Feedback Survey

Dear [Recipient's Name],

I hope this letter finds you well. As part of our ongoing commitment to academic excellence and continuous improvement, we are seeking your valuable feedback on the **(Write the name of the Programme)** programme offered at our esteemed institution. Your insights will play a crucial role in evaluating the effectiveness of the curriculum in meeting the Programme Educational Objectives (PEOs).

We believe that your experiences and perspectives as a student in the **(Write the name of the Programme)** programmes are invaluable in shaping the future of our academic offerings. Your candid feedback on *Disciplinary Knowledge, Communication Skills, Critical thinking, Problem-solving, Analytical reasoning, Research-related skills, Cooperation/Teamwork, Scientific reasoning, Self-directed learning, Moral and ethical awareness/reasoning Leadership readiness/qualities, and Lifelong learning* will assist us in identifying strengths and areas for enhancement, ensuring that we provide the best possible education to our students. We request you to spare 5-10 minutes for the completion of this questionnaire and we greatly appreciate your effort for the right cause. Answer/ rate them by quantifying them in 4 scales.

Survey- Questionnaires Rating Weightage

Attainment of POs	Rating	Rating Weightage
Very well accomplished	Excellent	4
Well accomplished	Very Good	3
Moderately accomplished	Good	2
Poorly accomplished	Average	1

Sl. No	Program Educational Outcomes (PEOs) <i>Note: The sample given below is from M.Sc., Mathematics Department. These are to be replaced with the respective Departmental PEOs.</i>	PEOs	Rating Weightage (√)			
			Excellent	Very Good	Good	Average
			4	3	2	1
1.	PROFESSIONAL GROWTH Keep on discovering new avenues in the chosen field and exploring areas that remain conducive to research and development.	PEO1				
2.	CORE PROFICIENCY To expertise the students to organize, understand, evaluate, and solve problems by Providing hands-on experience through modern tools necessary for practice.	PEO2				
3.	TECHNICAL PROFICIENCY To have the interdisciplinary knowledge and relate it to the technical aspect the impact of the subject concerned is very wide.	PEO3				
4.	MANAGEMENT SKILLS Encourage personality development skills like time management, crisis management, Stress interviews and working as a team.	PEO4				
5.	LEARNING ENVIRONMENT To provide students with knowledge and capability in formulating and analysis of mathematical models of real-life applications.	PEO5				

We genuinely appreciate your time and commitment to ensuring the continual enhancement of our academic programs. Your input is instrumental in maintaining the high standards of education that our institution strives to deliver. If you encounter any issues or have questions regarding the survey, please feel free to contact [Insert Contact Information].

Thank you once again for your participation and dedication to the ongoing improvement of our academic offerings.

Warm regards,

[Your Full Name] [Your Title/Position] [Institution Name]

Program Educational Objectives (PEOs) attainment **Feedback Survey** from **Employed Alumni Members**

ST. PHILOMENA'S COLLEGE AUTONOMOUS, MYSORE
Post Graduate Studies and Research Centre

ALUMNI FEEDBACK

Feedback Survey format to collect Program Educational Objectives (PEOs) attainment from Employed Alumni Members

Alumni Members (Write the name of the Programme)

Alumni Name: (Write the name of the Alumni)

Batch – (Write the Batch Number. Eg: 2020-22)

Subject: Invitation to participate in (Write the name of the Programme) PEOs Feedback Survey

Dear [Recipient's alumni Name],

I hope this letter finds you well. The department is reaching out to you as a chosen alum to gather your insights on how your educational journey has contributed to your professional development. As a distinguished graduate, your workplace experiences since graduation can provide invaluable feedback. Kindly take a moment to complete the attached form and return it to us. The questionnaire focuses on your learning experiences and accomplishments during your time in the program. Your input will assist us in identifying areas for improvement, if necessary to enhance the program and ensure the success of our graduates in their professional endeavors. Your participation is integral to our ongoing enhancement efforts and is crucial for the accreditation process

We sincerely appreciate the time and dedication you invested in completing this survey.

Alumni Survey Questionnaire

a)	<i>What is your primary job function? (Your job title or what you do in your work)</i>	
b)	<i>What is your year of graduation? (only the year, for example, 2019)</i>	

The following are the Program Educational Objectives (PEOs). As you are aware, these PEOs are anticipated to be achieved within a few years of the student’s graduation. Please rate the level of achievement of the objectives (*to indicate your level of agreement on the achievement of a particular objective considering your career and your workplace*). Answer/ rate them by quantifying them in 4 scales with a √ mark.

Program Educational Objectives (PEOs)	Rating			
	Completely achieved (4)	Mostly Achieved (3)	Slightly achieved (2)	Not achieved at all (1)
1. MENTION PEO 1				
2. MENTION PEO 2				
3. MENTION PEO 3				
4. MENTION PEO 4				
5. MENTION PEO 5				

We genuinely appreciate your time and commitment to ensuring the continual enhancement of our academic programs. Your input is instrumental in maintaining the high standards of education that our institution strives to deliver.

If you encounter any issues or have questions regarding the survey, please feel free to contact [Insert Contact Information].

Thank you once again for your participation and dedication to the ongoing improvement of our academic offerings.

Warm regards,

Sincerely,

Head of the Department

Program Educational Objectives (PEOs) attainment from Employer
ST. PHILOMENA'S COLLEGE AUTONOMOUS, MYSORE
Post Graduate Studies and Research Centre

EMPLOYER FEEDBACK

Feedback Survey format to collect Program Educational Objectives (PEOs) attainment from Employer

Alumni Members (Write the name of the Programme)

Alumni Name: (Write the name of the Alumni)

Batch – (Write the Batch Number. Eg: 2020-22)

**Subject: Invitation to participate in (Write the name of the Programme)
 PEOs Feedback Survey**

Dear [Recipient's Name],

I hope this letter finds you well. A few Postgraduate students from our Department have found employment within your esteemed organization, and we express our gratitude for offering them opportunities within your prestigious organization

As part of our ongoing commitment to academic excellence and continuous improvement, we are seeking your valuable feedback on the (Write the name of the Programme) program offered at our esteemed institution. Your insights will play a crucial role in evaluating the effectiveness of the curriculum in meeting the Program Educational Objectives (PEOs).

We believe that your experiences and perspectives as a student in the (Write the name of the Programme) programs are invaluable in shaping the future of our academic offerings. Your candid feedback will assist us in identifying strengths and areas for enhancement, ensuring that we provide the best possible education to our students. We request you to spare 5-10 minutes for the completion of this questionnaire and we greatly appreciate your effort for the right cause. Answer/ rate them by quantifying them in 4 scales with a \sqrt mark.

Survey- Questionnaires Rating Weightage

Attainment of POs	Rating	Rating Weightage
Very well accomplished	Excellent	4
Well accomplished	Very Good	3
Moderately	Good	2
Poorly accomplished	Average	1

To what extent are you content with the performance of the student/s in the following aspects?		Excellent	Very Good	Good	Average
		4	3	2	1
1.	Effective communication skills, leadership acumen, adept management capabilities, and positive relationships with superiors, peers, and subordinates.				
2.	Developing practical solutions for workplace challenges and demonstrating proficiency in utilizing technology, workplace equipment, and the ability to shoulder additional responsibilities. Displaying innovation and creativity in problem-solving.				
3.	Emphasizing collaborative teamwork, contributing to organizational objectives, and active participation in social activities.				
4.	Demonstrating proficiency in utilizing technology and workplace equipment. Showcasing creativity in overcoming workplace obstacles and possessing technical knowledge and skills.				
5.	Exhibiting self-motivation, assuming an appropriate level of responsibility, and showcasing planning and organizational skills. Displaying a willingness to embrace new ideas and learn novel techniques.				

In what ways do you suggest enhancing our programs? Can you provide insights Share your specific comments to enhance students' performance in the space provided below.

Phone:

Name: _____ Position: _____ Company/organization--

 We genuinely appreciate your time and commitment to ensuring the continual enhancement of our academic programs. Your input is instrumental in maintaining the high standards of education that our institution strives to deliver.

If you encounter any issues or have questions regarding the survey, please feel free to contact [Insert Contact Information].

Thank you once again for your participation and dedication to the ongoing improvement of our academic offerings.

Warm regards,

Sincerely,
 Head of the Department

a) THE WASHINGTON ACCORD IS AN INTERNATIONAL AGREEMENT BETWEEN BODIES RESPONSIBLE FOR ACCREDITING ENGINEERING DEGREE PROGRAMMES

Originally signed in 1989, the Washington Accord is a multi-lateral agreement between bodies responsible for accreditation or recognition of tertiary-level engineering qualifications within their jurisdictions that have chosen to work collectively to assist the mobility of professional engineers.

As with the other accords the signatories are committed to the development and recognition of good practice in engineering education. The activities of the Accord signatories (for example in developing exemplars of the graduates' profiles from certain types of qualification) are intended to assist growing globalization of mutual recognition of engineering qualifications. The Washington Accord is specifically focused on academic programmes which deal with the practice of engineering at the professional level.

The Accord acknowledges that accreditation of engineering academic programmes is a key foundation for the practice of engineering at the professional level in each of the countries or territories covered by the Accord.

The Accord outlines the mutual recognition, between the participating bodies, of accredited engineering degree programmes. It also establishes and benchmarks the standard for professional engineering education across those bodies.

Currently, twenty signatories make up the Washington Accord.

There are also eight organizations, which hold provisional signatory status

b) BLOOM'S 2 SIGMA DEVIATION

Standard Deviation

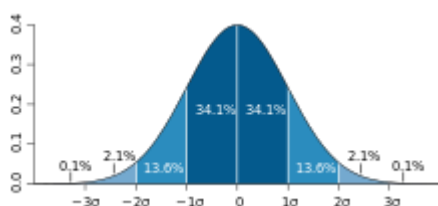
The standard deviation represents a measure of how widely or narrowly scores are dispersed for a particular data set. Specifically, it is the square root of the average squared deviation of scores about their arithmetic mean.

In statistics, the **standard deviation** is a measure of the amount of variation or dispersion of a set of values. A low standard deviation indicates that the values tend to be close to

the mean (also called the expected value) of the set, while a high standard deviation indicates that the values are spread out over a wider range.

Standard deviation may be abbreviated in mathematical texts and equations by the lowercase Greek letter σ (sigma)

In Microsoft Excel, the standard deviation is computed in the same way, but all of the above calculations are performed behind the scenes. The key thing for you is to choose a proper standard deviation function, about which the following section will give you some clues.



In statistics, "2 sigma" refers to a confidence interval that extends to two standard deviations away from the mean of a normal distribution. The term "sigma" (σ) represents the standard deviation, which is a measure of the dispersion or spread of data points around the mean in a dataset that follows a normal distribution.

A "2 sigma" confidence interval is commonly used to express a range of values within which a specified proportion of data points is expected to fall. In a normal distribution:

- Approximately 68% of the data falls within one standard deviation ($\pm 1\sigma$) of the mean.
- Approximately 95% of the data falls within two standard deviations ($\pm 2\sigma$) of the mean.
- Approximately 99.7% of the data falls within three standard deviations ($\pm 3\sigma$) of the mean.

When researchers or statisticians refer to a "2 sigma" confidence interval, they are typically indicating a range that covers about 95% of the data. This means that they are 95% confident that the true value or population parameter lies within this interval.

For example, if the mean of a dataset is 50 and the standard deviation is 5, then the "2 sigma" confidence interval would be from 40 to 60. This means that we are 95% confident that the true population mean falls within this range.

The use of sigma and confidence intervals is prevalent in statistical analysis, hypothesis testing, and assessing the uncertainty associated with estimates made from sample data.

One standard deviation, or one sigma, plotted above or below the average value on that normal distribution curve, would define a region that includes 68 percent of all the data points.

Two sigma's or below would include about 95 percent of the data, and three sigma's would include 99.7 percent.

Bloom's 2 sigma problem refers to the educational phenomenon that the average student *tutored* one-to-one using *mastery learning* techniques performed *two standard deviations* better than students educated in a *classroom* environment. It was originally observed by *educational psychologist Benjamin Bloom* and reported in 1984 in the journal *Educational Researcher*. Bloom's paper analyzed the dissertation results of University of Chicago Ph.D. students Joanne Anania and Joseph Arthur Burke. As quoted by Bloom: "The average tutored student was above 98% of the students in the control class". Additionally, the variation of the students' achievement changed: "About 90% of the tutored students attained the level of summative achievement reached by only the highest 20%" of the control class.

The phenomenon's associated problem, as described by Bloom, was to "find methods of group instruction as effective as one-to-one tutoring". The phenomenon has also been used to illustrate those factors outside of a teacher's control influence student education outcomes, motivating research in alternative *teaching methods*, in some cases reporting larger standard deviation improvements than those predicted by the phenomenon. The phenomenon has also motivated developments in *human-computer interaction* for education, including *cognitive tutors* and *learning management systems*

c) MASTERY LEARNING

Mastery learning is an *educational philosophy* first proposed by Bloom in 1968 based on the premise that students must achieve a level of mastery (e.g., 90% on a knowledge test) in prerequisite knowledge before moving forward to learn subsequent information on a topic. Mastery is determined with regular tests, and students who do not yet achieve mastery on the test are given additional educational support before another test. This cycle continues until the learner accomplishes mastery, and they may then move on to the next stage. Failure for a student to achieve mastery is viewed, differently from conventional *educational testing*, as due to instruction rather than lack of student ability. Another key element of mastery learning is that

it requires attention to individual students as opposed to assessing group performance. There is good evidence to suggest the effectiveness of mastery learning for improving student educational outcomes.

Two of the three groups in the original study by Bloom conducted mastery learning, with one *control group* that did not.

d) CORRELATIONS

Though Bloom concluded that one-to-one tutoring is "too costly for most societies to bear on a large scale", Bloom conjectured that a combination of two or three altered variables may result in a similar performance improvement. Bloom thus challenged researchers and teachers to "find methods of group instruction as effective as one-to-one tutoring". Bloom's graduate students Joanne Anania and Arthur J. Burke conducted studies of the effect at different grade levels and in different schools, observing students with "great differences in cognitive achievement, attitudes, and academic self-concept".

Bloom classified alterable variables that may have, in combination, a 2 sigma effect as the following "**objects of change process**":

- 1. Learner**
- 2. Instructional material**
- 3. Home environment or peer group**
- 4. Teacher**

e) ACKNOWLEDGEMENT

We duly acknowledged and gave appropriate consideration to all the known or unknown sources used to draft these OBE guidelines to incorporate while drafting the Curriculum for the various programmes offered in the College.