Outcome-Based Education (OBE) Guideline

NIIT University

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NIIT University (NU) is committed to providing a transformative educational experience that prepares students for success in a dynamic and evolving world. With a focus on Outcome-Based Education (OBE), NU aims to equip students with the knowledge, skills, and competencies necessary for personal growth, professional excellence, and societal impact. This guideline outlines NU's approach to implementing OBE, ensuring alignment with institutional goals and fostering a culture of continuous improvement.

1. **NU's Vision & Mission:**

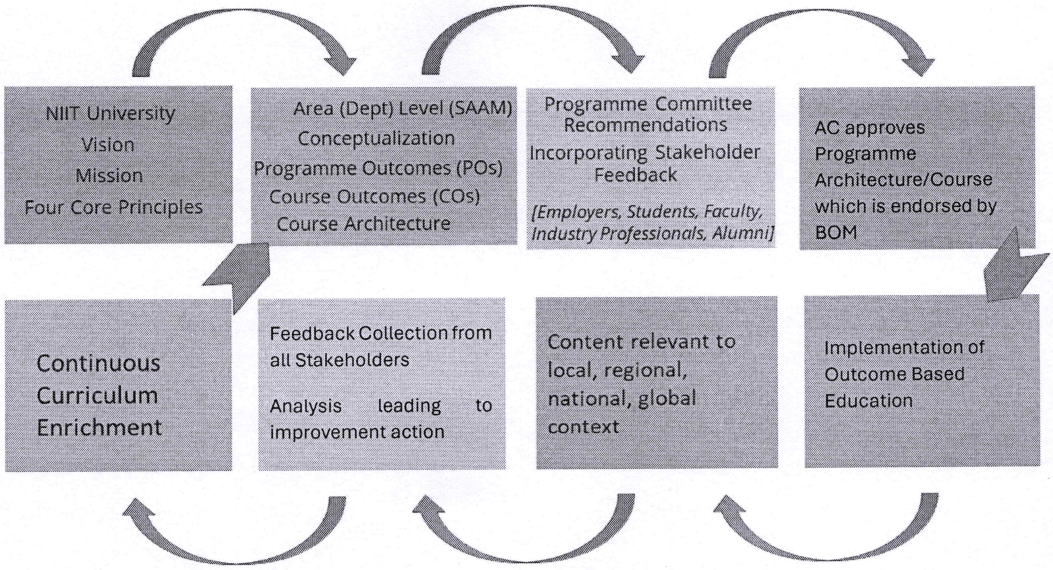
- NU's vision is to be the role model of learning, research, innovation, and sustainability for the knowledge society.
- The mission of NU are
    - To deliver distinctive education through the pioneering use of technology.
    - To develop superior talent through partnerships with industry and society.
    - To promote research, discovery, and entrepreneurship through collaborative action.
    - To build responsible citizens of the world by instilling a culture of seamlessness in all facets of life.
- Department-wise consultations, stakeholder engagement, and strategic planning sessions shall be conducted to define clear departmental visions and missions aligned with NU's overarching goals.

2. **Establishing Programme Educational Objectives (PEOs) & Program Outcomes (POs):**

Our PEOs are derived from our vision and mission and reflect the long-term goals we aim to achieve through our educational programs. These may include objectives such as producing graduates who demonstrate leadership skills, exhibit ethical behavior, and engage in lifelong learning.POs are specific statements that describe what students are expected to know and be able to do upon completion of a program. These outcomes are aligned with our PEOs and provide a framework for curriculum design and assessment. POs may encompass skills such as critical thinking, effective communication, and domain knowledge.

- PEOs must be futuristic and reflect the expected achievements of graduates, emphasizing leadership, innovation, ethical conduct, and lifelong learning.

- Faculty members, in collaboration with industry experts and alumni, shall define PEOs tailored to each programme, ensuring relevance to contemporary industry needs (Flow chart -1).



Flow Chart-1

- The finalization of PEOs shall involve approval from the Sub Area Academic Monitoring Committee (SAAM)/ Department Committee, Programme Committee, and Academic Council.
- POs shall be aligned with accreditation standards wherever applicable and industry requirements, emphasizing knowledge acquisition, critical thinking, communication skills, and social responsibility.
- The drafting and approval process for POs shall involve consultation with stakeholders, including faculty, students, parents, alumni, and industry partners (Flow chart-1)

3. Bloom's Taxonomy and Course Outcomes:

To develop teaching and learning frameworks and assessment strategies to imbibe higher-order thinking skills amongst the students. Design rubrics wherever applicable to serve as a tool for evaluating learning outcomes across various domains and inculcate self-learning habits amongst the students.

3.1. Establishing Course Outcomes (COs):

COs are derived from POs and represent the specific learning objectives of individual courses. Each course is designed to contribute towards the attainment of one or more POs. COs are made using Bloom's Taxonomy, ensuring that they cover various cognitive levels from remembering and

understanding to applying, analyzing, evaluating, and creating. This taxonomy provides a structured approach to designing COs that promote higher-order thinking skills and deeper learning experiences.

- COs at NU articulate the specific learning objectives of each course, focusing on application-oriented learning, problem-solving skills, and interdisciplinary perspectives.
- Faculty members shall design COs with input from subject matter experts, incorporating innovative pedagogies and assessment strategies.
- CO-PO mapping shall ensure alignment between course outcomes and programme outcomes, facilitating a cohesive learning experience for students.
- Assessment methodologies shall be diverse and inclusive, encompassing examinations, projects, presentations, and experiential learning opportunities.

Assessment types at NU

- **External Assessment:**

External assessments, such as Mid-term/Sem and Comprehensive examinations, validate student learning outcomes independently. These assessments may be aligned with industry standards or regulatory requirements to ensure the relevance and quality of our programs. In industry practice (20 credit course), the industry mentor also evaluates the student twice in the six months and rates the student with 10 dimensions. A project like Learner Primer League, involves all faculty members to evaluate each team including industry sponsors. In R&D projects apart from the guide, other faculty members also evaluate the students and give marks.

- **Internal Assessment:**

Internal assessments are conducted by faculty members throughout Project, Quiz, Assignments, Technical report writing, etc. to measure both cognitive and non-cognitive skills.

4. Implementation and Monitoring:

- NU shall adopt a learner-centric approach to curriculum design and delivery, emphasizing active engagement, collaboration, and reflection.
- Regular assessment and feedback mechanisms shall be implemented to monitor student progress and identify areas for improvement.
- Faculty development programmes shall be conducted to enhance teaching effectiveness and promote innovative instructional practices.

- Evaluation of OBE implementation shall be conducted through contentious internal audits, external reviews, and stakeholder surveys.
- NU's commitment to continuous improvement shall drive initiatives to enhance curriculum relevance, pedagogical innovation, and student support services.

5. Question Paper and Bloom's Taxonomy

At NIIT University, the utilization of Bloom's Taxonomy in setting question papers ensures that assessments align with our educational philosophy and objectives. Here's how we incorporate Bloom's Taxonomy into the question paper creation process:

1. **Understanding Bloom's Taxonomy Levels:**
    - Before constructing question papers, faculty members familiarize themselves with Bloom's Taxonomy levels, which include remembering, understanding, applying, analyzing, evaluating, and creating. Each level represents a different cognitive skill, guiding the design of questions that cater to various depths of understanding and thinking.
2. **Aligning Questions with Course Outcomes:**
    - The first step in creating a question paper is to align the questions with the Course Outcomes (COs) derived from Program Outcomes (POs). Each question is mapped to specific COs, ensuring that the assessment measures the intended learning objectives of the course.
3. **Designing Questions for Different Bloom's Levels:**
    - Question papers include a variety of questions that span multiple Bloom's Taxonomy levels. For example:
        - Remembering: Questions at this level assess students' ability to recall factual information or basic concepts.
        - Understanding: Questions assess students' comprehension and interpretation of information.
        - Applying: Questions require students to apply their knowledge and understanding to solve problems or complete tasks.
        - Analyzing: Questions prompt students to break down complex concepts or scenarios and identify patterns or relationships.
        - Evaluating: Questions assess students' ability to make judgments or critiques based on evidence or criteria.
        - Creating: Questions challenge students to generate new ideas, solutions, or products.
4. **Ensuring Cognitive Rigor and Balance:**
    - Question papers are designed to maintain a balance of cognitive rigor across Bloom's Taxonomy levels. While some questions may focus on lower-order thinking skills (e.g., remembering, understanding), others emphasize higher-order thinking skills (e.g.,

analyzing, evaluating, creating). This balance ensures a comprehensive assessment of students' learning outcomes.

5. **Promoting Critical Thinking and Application:**
    - Questions are made to encourage critical thinking, problem-solving, and real-world application of knowledge. This approach fosters deeper understanding and prepares students for challenges they may encounter in their academic and professional endeavors.
6. **Continuous Review and Improvement:**
    - Faculty members regularly review and refine question papers to ensure their alignment with Bloom's Taxonomy and the intended learning outcomes of the course. Feedback from students and assessment results inform iterative improvements to the assessment process.

By integrating Bloom's Taxonomy into the question paper creation process, NIIT University ensures that assessments effectively measure students' learning outcomes and promote the development of essential cognitive skills across various levels of complexity. There is a constant effort to improve the attainment of CO-PO outcomes based on course outcomes.

Step-by-step process to calculate Course-wise attainment and Program Outcome (PO) attainment. (Approved in 49, Dated July 25, 2023)

Step 1: Calculate the Level of Attainment for each course for their Course Outcomes (CO)

For each course CO_i, calculate the percentage of students who achieved A to C Grade using the formula: Level_i = (A_i + B_i + C_i) / Total Students_i * 100, where A_i, B_i, and C_i are the number of students who got A, B, and C grades, respectively, in the course CO_i.

Step 2: Determine the Achievement Level of COs for each course (CO)

- If Level_i ≥ 80%, then the achievement level for the course CO_i is Level-3.
- If 70% ≤ Level_i < 80%, then the achievement level for the course CO_i is Level-2.
- If 60% ≤ Level_i < 70%, then the achievement level for the course CO_i is Level-1.
- If Level_i < 60%, then the achievement level for the course CO_i is Level-0.

Step 3: Calculate α_i for each course CO_i

- α_i = Level_i / 3, where Level_i is the achievement level for the course CO_i as determined in Step 2.

Step 4: Determine the Contribution of each Program Outcome (PO_i)

- Given the contribution values β_i for each Program Outcome PO_i (PO1, PO2, PO12, etc.), use the given β_i values to represent the contribution of each PO_i to the overall attainment.

Step 5: Calculate Program Outcome Attainment for each PO_i

- For each Program Outcome PO_i, calculate the attainment using the formula:
- Attainment_PO_i = (α_1 * β_1 + α_2 * β_2 + ⋯ + α_n * β_n) / n,
- where n is the number of courses considered (CO_1, CO_2, ..., CO_n) and α_i and β_i are as calculated in Step 3 and Step 4.

Step 6: Batch-wise Calculation

- Combine all batches (B.Tech. 1st Year, 2nd Year, 3rd Year, 4th Year, etc.) and include all courses of that batch.
- Calculate the Level of Attainment for each course in the combined batch as described in Step 1.
- Determine the Achievement Level for each course in the combined batch as described in Step 2.
- Calculate α_i for each course in the combined batch as described in Step 3.
- Calculate Program Outcome Attainment for each PO_i in the combined batch as described in Step 5.

The final attainment level will be the calculated Program Outcome Attainment for each PO_i based on the combined data from all batches and courses.

The above process outlined for calculating Course-wise attainment and Program Outcome (PO) attainment aligns well with NIIT University's Outcomes-Based Education (OBE) guidelines and Bloom's Taxonomy. Here's how each step corresponds to these frameworks:

1. **Alignment with OBE Guidelines:**
    - NIIT University's OBE guidelines emphasize the importance of defining clear learning outcomes at both the course and program levels. The step-by-step process begins with calculating the Level of Attainment for each Course Outcome (CO), ensuring that specific learning objectives are assessed and measured against predefined criteria.
2. **Integration with Bloom's Taxonomy:**
    - Bloom's Taxonomy provides a structured framework for designing and assessing learning objectives at various cognitive levels. The process of determining the Achievement Level of COs for each course aligns with Bloom's Taxonomy by evaluating the depth of student understanding and mastery of course content. The taxonomy's levels (e.g., remembering, understanding, applying, analyzing, evaluating, creating) implicitly guide the assessment criteria for each CO.
3. **Promotion of Higher-Order Thinking:**
    - The calculation of the Level of Attainment and subsequent determination of Achievement Levels for COs encourage the assessment of higher-order thinking skills, such as analysis, evaluation, and creation. This approach ensures that students are not only able to recall and understand information but also apply, analyze, evaluate, and create new knowledge and solutions.
4. **Assessment of Program Outcomes (POs):**
    - The process extends beyond individual courses to assess the attainment of Program Outcomes (POs), which are aligned with broader educational objectives. By calculating

the Program Outcome Attainment for each PO based on the contributions of individual COs, the method ensures that the overall program effectively prepares students to meet the desired learning outcomes and achieve the institution's educational goals.

5. **Holistic Evaluation across Batches:**

   - The inclusion of batch-wise calculations allows for a holistic evaluation of student attainment across multiple cohorts. This approach reflects NIIT University's commitment to continuous improvement and ensures that assessment outcomes are representative of the diverse student population over time.

Overall, the step-by-step process for calculating Course-wise attainment and Program Outcome attainment demonstrates a comprehensive and systematic approach to assessment that is aligned with NIIT University's OBE guidelines and promotes the principles of Bloom's Taxonomy.

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