OFFICE OF DEAN ACADEMICS

Policy Document

KLEF/ODA/2.13/P213001/2022/V1.0   Date: 09/08/2022

Title: Outcome-Based Education (OBE)

1. Policy: All the programs offered should adopt Outcome Based Education (OBE) in order to enhance the opportunities for the students with respect to their career track (through a student-centric approach). The Program Educational Objectives (PEOs) of the respective program of study are aligned with the vision and mission of the department which intern are aligned to the vision and mission of the institute. The Program Outcomes (POs) of the respective program of study are achieved through the Course Outcomes (COs). Necessary remedial actions are taken at regular intervals to ensure the proper attainment of outcomes by the students. The evaluation procedures outlined are to be followed by the departments before arriving at the data for the Outcome attainment analysis.

2. Outcomes:

2.1. Enhanced opportunities for the students in their chosen career track

2.2. Timely intervention for taking remedial actions

2.3. Transparent evaluation strategies to support different learning styles of the students

3. Guidelines:

3.1. Outcome-based education is an approach to education in which decisions about the curriculum, instruction and assessment are driven by the learning outcomes that the students should display at the end of a program or a course.

3.2. The **vision and mission** statements are the guiding forces behind an institute/department. The vision statement provides insight into what the institute/department focus to achieve or become in the future. The mission statement communicates the process involved in achieving the vision. An effective vision statement should be concise, unambiguous, futuristic, realistic, aspirational, and inspirational. Furthermore, it shouldn't be generic but rather focus on outcomes specific to the institute/organization. A good mission statement should focus on the ways to achieve the vision of the institute/department. It should be brief, clear, informative, simple, and direct. Further, the mission and vision statements guide strategic development, creation of processes and the objectives of the institute/department to its stakeholders.

3.3. Program Educational Objectives (PEOs) are statements that describe the expected accomplishments of graduates in the initial years (preferably three to six years) after graduation. Also, PEOs are broad statements that describe the career and professional aspects that the program is preparing its graduates to achieve in future. During the process of formulating the PEOs, necessary inputs and feedback be obtained from the stakeholders through direct and indirect methods (effective questionnaires). PEOs contribute towards attainment of the mission of the department. However, PEOs being objective statements, which are qualitative in nature, they are mapped with the mission of the department through measurable goals. The attainment of PEOs is measured through these goals in the form of effective questionnaires, feedback, and responses from the alumni, their colleague, employer, etc. in order to ensure the attainment of the same. Minimum of 60% of alumni from whom the feedback should be taken while analysing the attainment of PEOs.

3.4. Graduate attributes (GAs) represent the standard abilities to be looked for in a graduate of any undergraduate degree program. They form the Program Outcomes (POs) that reflect the skills,

2

knowledge, and abilities of graduates regardless of the field of study. At the same time, POs are necessarily independent of disciplinary knowledge rather, these qualities may be developed in various disciplinary contexts. These are the expectations derived through deliberations and generalized appropriate to the program of study by the accreditation bodies viz. NBA, ABET, etc. POs / SOs are composite statements made-up of multiple aspects relevant to a broader outcome like domain knowledge, design, analysis, etc. They also ensure holistic development of the students by covering aspects like communication, ethics, project management, etc. The number of POs/SOs may vary between 9 - 12 POs for a 4-year program, 7 – 9 POs for a 3-year program, and 5 – 7 POs for a 2-years program.

3.5 Two Step Process in aligning POs with Assessments:

POs give useful guidance at the program level for the curriculum design, delivery, and assessment of student learning. However, they represent fairly high-level generic goals that are not directly measurable. Real observability and measurability of the POs at the course level is very difficult. To connect high-level learning outcomes (POs) with course content, course outcomes and assessment, there is a necessity to bring further clarity and specificity to the program outcomes. This can be achieved through the following two-step process of identifying Competencies and Performance Indicators (PI).

Identify Competencies to be attained: For each PO define competencies –different abilities implied by program outcome statement that would generally require different assessment measures. This helps us to create a shared understanding of the competencies we want students to achieve. They serve as an intermediate step to the creation of measurable indicators.

Define Performance Indicators: For each of the competencies identified, define performance Indicators (PIs) that are explicit statements of expectations of the student learning. They can act as measuring tools in assessment to understand the extent of attainment of outcomes. They can also be designed to determine the appropriate achievement level or competency of each indicator so that instructors can target and students can achieve the acceptable level of proficiency

3.6. Program Specific Outcomes (PSOs) are statements about the additional graduate attributes or outcomes that are specific to a program in addition to defined POs. PSOs are statements that

define the outcomes specific to a program that enables the learners to excel in their respective field of study and contribute to the development of solutions appropriate to the domain.

3.7. Course Outcomes (COs) are specific, measurable statements that help the learners to understand the capabilities to be attained by them at the end of the course. COs should highlight what the learner can attain by studying the course and undergoing the evaluation of outcomes prepared for the same. It includes the knowledge to be gained, skills to be acquired and the application of the same towards solving problems specific to the context. The topics for the course should be decided based on the course outcomes in such a way that the specific topics alone do not map to the specific course outcomes.

Also, the COs contributes towards the attainment of the Program Outcomes of the respective program of study enrolled by the learner. COs being qualitative statements, the attainment of the same is measured through the Course Outcome Indicators (COIs) which clearly state what is expected from the learner at what levels through the assessments to be carried out.

3.8. Bloom's Taxonomy for Assessment Deign:

It attempts to divide learning into three types of domains (cognitive, affective, and behavioural) and then defines the level of performance for each domain. Conscious efforts to map the curriculum and assessment to these levels can help the programs to aim for higher-level abilities which go beyond remembering or understanding, and require application, analysis, evaluation or creation.

Revised Bloom's taxonomy in the cognitive domain includes thinking, knowledge, and application of knowledge. It is a popular framework in engineering education to structure the assessment as it characterizes complexity and higher-order abilities. It identifies six levels of competencies within the cognitive domain viz. Knowledge, understanding, application, analysis, creation, and evaluation. The COIs are appropriately mapped to Bloom's Taxonomy Levels (BTLs) to evaluate the attainment of course outcomes at the varied levels.

To evaluate the student works for attainment of course outcomes and hence POs, it is of utmost importance to have reliable methods / proper assessment tools. Rubrics provide a powerful tool for assessment and grading of student work. They can also serve as a transparent and inspiring

4

guide to learning. Rubrics are scoring, or grading tool used to measure a students' performance and learning across a set of criteria and objectives. Rubrics communicate to students (and to other markers) your expectations in the assessment, and what you consider important. There are three components within rubrics namely (i) criteria / performance Indicator: the aspects of performance that will be assessed, (ii) descriptors: characteristics that are associated with each dimension, and (iii) scale/level of performance: a rating scale that defines students' level of mastery within each criterion.

3.9. The departments are required to summarize the analysis of the PEO attainment of the various programs offered by it and take a call on revising its vision and mission accordingly over the span of 8-10 years. Also, the institute is required to summarize the analysis of the attainment of the vision and mission of the departments and revise its vision and mission accordingly over the span of 10-15 years.

3.10. CO-PO course articulation matrix should indicate the correlation between the CO and PO based on the extent to which the CO contributes to the PO. This is mapped at three levels 1, 2 or 3 representing low, medium and highly mapped respectively. The level of mapping is determined by the extent to which the COs map with the PO Indicators of a specific Program Outcome. This also ensures that every PO is being covered across the courses offered as a part of the program. The matrix will be adopted for all the courses run by the department. Once CO statements are identified and formed by the respective course coordinator, then the COs are mapped with suitable POs through Program Outcome Indicators (POI). Refer Annexure O-1 AICTE Examination Reforms. The COs are also mapped to the PSOs in the articulation matrix in the same way.

3.11. The **attainment of COs** of any course can be assessed from the performance of the students through the formative and summative assessments. The goal of formative assessment is to understand/realize the critical information about student comprehension throughout the learning

process and provides an opportunity for the facilitator to improve their pedagogical approach and students to improve learning outcomes.

The goal of summative assessment is to evaluate student learning outcomes at the end of the course instruction. According to the university policy, 60% weightage is for the formative assessment, and 40% weightage is for the summative assessment. The detailed guideline for formative and summative assessments is indicated in policy #: KLEF/ODA/2.6/P26001/2022/V1.0

3.12. The **outcome attainment analysis** on formative assessments is carried out one after Sem-in 1 and another after Sem-in 2. These include the attainment of outcomes will respect to all the formative components viz. ALMs, insem , project (if any), etc. as per the evaluation plan. The overall analysis on the attainment of all the outcomes is done once after the final exam results are announced. The threshold value of 60% is normally set for each of the COs for the estimation of CO attainment of the course. The attainment levels of COs are classified as follows.

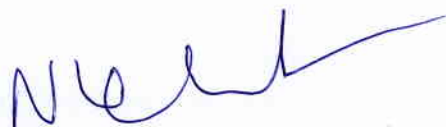| Assessment Method	Attainment Level	Range
Internal Assessment (60%) & External Assessment (40%)	Level 1	60% to 74 %
	Level 2	75% to 89 %
	Level 3	90% to 100%

From the CO attainment analysis of the course, the list of slow learners should be identified by the course coordinator and timely remedial action should be initiated to avoid further descaling in the attainment of an outcomes. Indirect feedback in the form of course exit survey may be taken from the students to understand their perception on the attainment of the course outcomes of every course.

3.13. The PO/PSO assessment should be carried out by both direct and indirect assessment. The assessment can be estimated by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Direct assessment is purely based on CO attainment through the course

evaluation plan, and indirect assessment is through the feedback taken from the relevant stakeholders of the system. Indirect assessment can be done in the form of a graduate exit survey where the student is required to answer the questionnaire that reflects their satisfaction with respect to the attainment of POs and PSOs. The questionnaire should be carefully designed so as to not have the POs/ PSOs themselves as direct questions.

Each PO attainment of corresponding to a specific course can be determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values. Similarly, the values of PSO attainment are also calculated. The threshold value of 60% shall be set for the POs and PSOs and the same can be modified with due approval of the Academic Council (AC).

The gap identified in the attainment of the COs and POs can be addressed by arranging invited talks from the industry, bridge courses, organizing workshops, arranging field visits (industrial visits) with respect to the course, improving the student performance under the innovative teaching-learning process of the institution, etc.

Dr. N. Venkatram
Pro-VC
Prof.N. VENKATRAM

Dr. Raghuveer V R
Dean Academics