Teaching Learning & Evaluation:

In order to deliver education through a student-centric approach and adhere to an outcome-oriented teaching and learning process, institute has been using Outcome-Based Education (OBE) since 2018. Before leaving the Institute, OBE assists the student in achieving significant outcomes. A variety of committees, such as the Department Advisory Board (DAB), the Internal Quality Assurance Cell (IQAC), the Program Assessment Committee (PAC) are formed and faculty, staff, and students have been included. These committees guide and monitor the implementation of OBE in the college.

The OBE frame work at Netaji Subhas Institute of Technology is as shown below in Fig.1

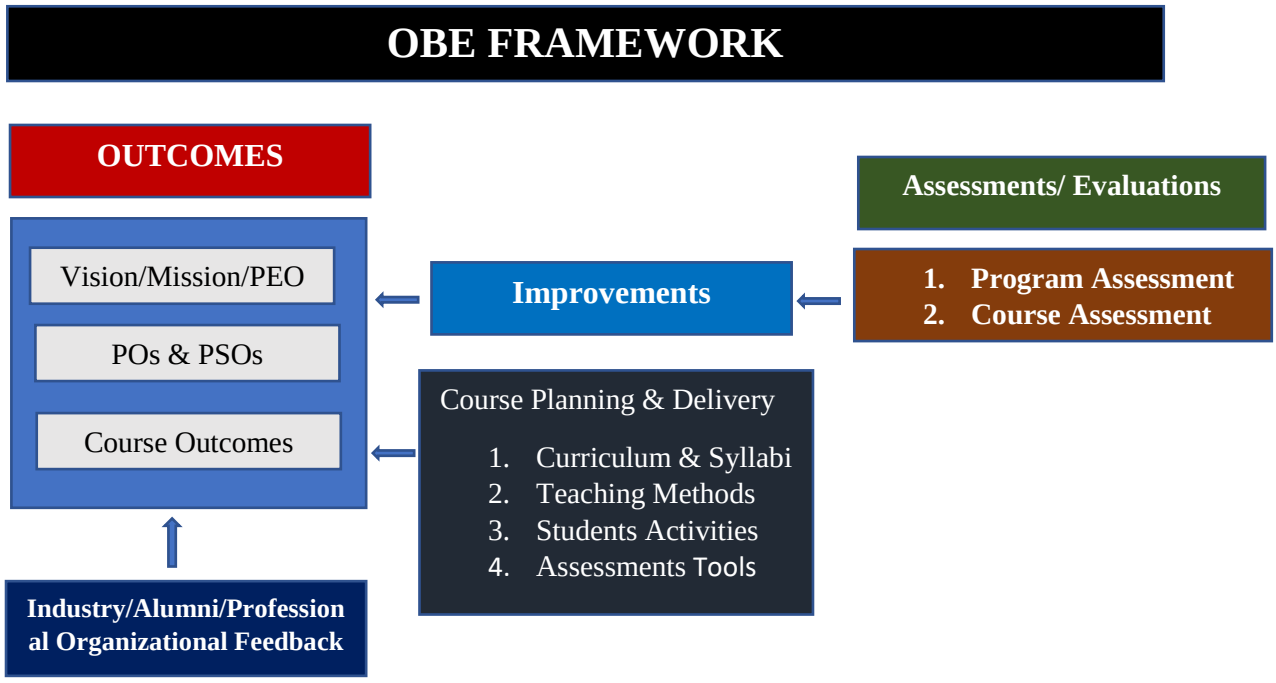

Fig. 1 OBE Framework

The step by step of OBE implementation at the Institute is shown below:
1. Establish Vision and Mission statements in line with the Institution Vision and Mission Statements and formulation of Program Educational Objectives(PEOs) of the program.

- The program's vision, mission, and PEOs are developed through a systematic feedback and analysis approach that takes the Institute's goal into consideration as well as understanding the needs on a national and international level.

2. Dissemination of Department Vision Mission and PEOs of the program:

Vision, Mission and PEOs of the program, POs, PSOs and COs are published in the college website. The dissemination of the same to the stake holders such as Faculty, Students, Alumni, Parents and Employers are done as mentioned below:

- Displayed in college website
- Students receive a course plan at the start of each semester that contains POs, PSOs, and COs.
- Discussions in the Orientation Program
- Displayed in Key locations such as HOD Rooms, Class Rooms, Laboratories, Department Corridors.

3. Establish Programme Specific Outcomes (PSOs) based on the strength of the department:

- The competencies that students should possess upon graduating in relation to a particular field are known as program specific outcomes. Usually, two to three PSOs are framed for a program based on the strength of the department.
- PSOs are published in the college website and disseminated to the stake holders such as Faculty, Students, Alumni, Parents and Employers through Course Plan given to the students at the beginning of each semester.

4. Establish Program Articulation Matrix(PAM):

- The curriculum of the program is designed with core, Professional elective and open elective courses.
- Program Articulation Matrix is formed by the strength of correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation and 1 for slight (low) correlation.

5. Establish Course Articulation Matrix (CAM):

- Course Articulation Matrix (CAM) correlates the individual COs of a course with POs and PSOs.
- The strength of correlation is indicated as 3 for substantial (high) 2 for correlation, moderate (medium) correlation, and 1 for slight (low) correlation.

6. Develop Course Plan

Every semester, before classes begin, faculty members prepare the course plan. The following is a list of the contents of the course plan:

- Course Time Table
- Course Outcomes
- Course Mapping with PO & PSO
- Syllabus
- Course Delivery Plan
- Question Papers
- Assignment questions
- Teaching learning Resources
- Course evaluation pattern
- Course attainment sheet

7. Pedagogical tools for course outcomes delivery

- Effective teaching strategies and pedagogical initiatives can lead to high-quality teaching and learning.
- In order to teach the course, the department's faculty uses a variety of pedagogical initiatives, including Collaborative Learning, Experimental Based Learning, Model Based Learning, and Technical Quiz.

8. Course Evaluation pattern

Assessment tools in the Course Evaluation pattern are divided into two categories: direct and indirect methods.

- Direct methods show the knowledge and abilities of the students based on their performance in seminars, end-of-semester exams, classroom and laboratory tasks, and continuous internal assessment tests.

- However, in indirect method, such a course-ending survey, is used to evaluate the students' understanding of the subject matter and is computed using pre-established rubrics.

9. Course Evaluation - Setting Question papers

The course faculty prepare the question bank by taking questions from previous year's university examination papers and the textbook. The questions are prepared with different cognitive level (viz., analysing the problems, implementation of modern tools, formulating the problems etc.), by appropriate Bloom's Taxonomy to test the students broader understanding of a subject. CO is marked with Bloom's Level for all the questions. Question bank is submitted to HOD for approval after Course coordinator scrutiny. The HOD instructs the coordinator to reconstruct the Question bank if the question bank doesn't offer the right level of challenge.

Attainment of program outcomes, program specific outcomes and course outcomes:

Evaluation of Course Outcomes

Assessment tools in the Course Evaluation pattern are divided into two categories:

- Direct Assessment
- Indirect Assessment

Direct Assessment: This assessment shows the knowledge and abilities of the students based on their performance in seminars, end-of-semester exams, classroom and laboratory tasks, and continuous internal assessment tests.

Indirect Assessment: In indirect assessment, such a course-ending survey, is used to evaluate the students' understanding of the subject matter and is computed using pre-established rubrics.

The attainment of all COs in each course is computed based on the knowledge level after setting the expected attainment level.

The overall attainment of COs is calculated as follows:

Direct attainment of COs = 0.8*CIA attainment+ 0.2*ESE attainment

Indirect attainment of COs = Attainment calculated through Course End Survey

Overall attainment of COs=0.8* Direct attainment+0.2* Indirect attainment

Where CIA is Cumulative Internal Assessment that includes Internal Assessment test and Assignment for Theory courses, Continuous Assessment and Model Examination for Laboratory courses and ESE is End Semester Examination.

Indirect Assessment:

In the CO attainment calculation for a course, 80% is contributed through direct and 20% through Indirect. 20% weightage is given for CO attainment through student feedback for indirect assessment. At the end of the semester, feedback forms (course wise) are circulated and responses from the students are recorded.

Evaluation of POs and PSOs

The assessment of Program Outcome is carried out using data collected from Direct and indirect methods.

Direct assessment:

POs and PSOs attainment through direct assessment are calculated for each course as follows:

$$\left\{\frac{\text{CO} - \text{PO Mapping Strength} * \text{Related CO Attainment Value}}{\text{Sum of CO} - \text{PO Mapping Strength}}\right\}$$

Indirect Assessment

The survey results from Graduates, Alumni, and Employers are recorded as attainment level of POs/PSOs through indirect assessment.

Evaluation Tool	Frequency of Evaluation
Course End Survey	Yearly/End of program
Alumni Survey	Yearly/After course completion

The PO/PSO attainment is calculated by fixing weightage as follows:

The overall attainment values are calculated by considering 80% weightage to direct assessment and 20% weightage to indirect assessment.

PO/PSO Attainment = 80% of Direct Attainment + 20% of Indirect Attainment

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AFFILIATED TO BIHAR ENGINEERING UNIVERSITY, PATNA
AMHARA, BIHTA PATNA – 801103

Program Outcomes:

1. CIVIL ENGINEERING	Link
2. MECHANICAL ENGINEERING	Link
3. ELECTRONICS & COMMUNICATION ENGINEERING	Link
4. COMPUTER SCIENCE ENGINEERING	Link
5. ELECTRICAL & ELECTRONICS ENGINEERING	Link

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Course Outcomes & Program Outcomes Attainment:

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3. ELECTRONICS & COMMUNICATION ENGINEERING	Link
4. COMPUTER SCIENCE ENGINEERING	Link
5. ELECTRICAL & ELECTRONICS ENGINEERING	Link