SANDIP FOUNDATION'S

SP

SANDIP POLYTECHNIC

NBA

NATIONAL BOARD OF ACCREDITATION

Diploma in Engineering

Civil | Mechanical | Electrical

2024-2027

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SANDIP POLYTECHNIC, NASHIK

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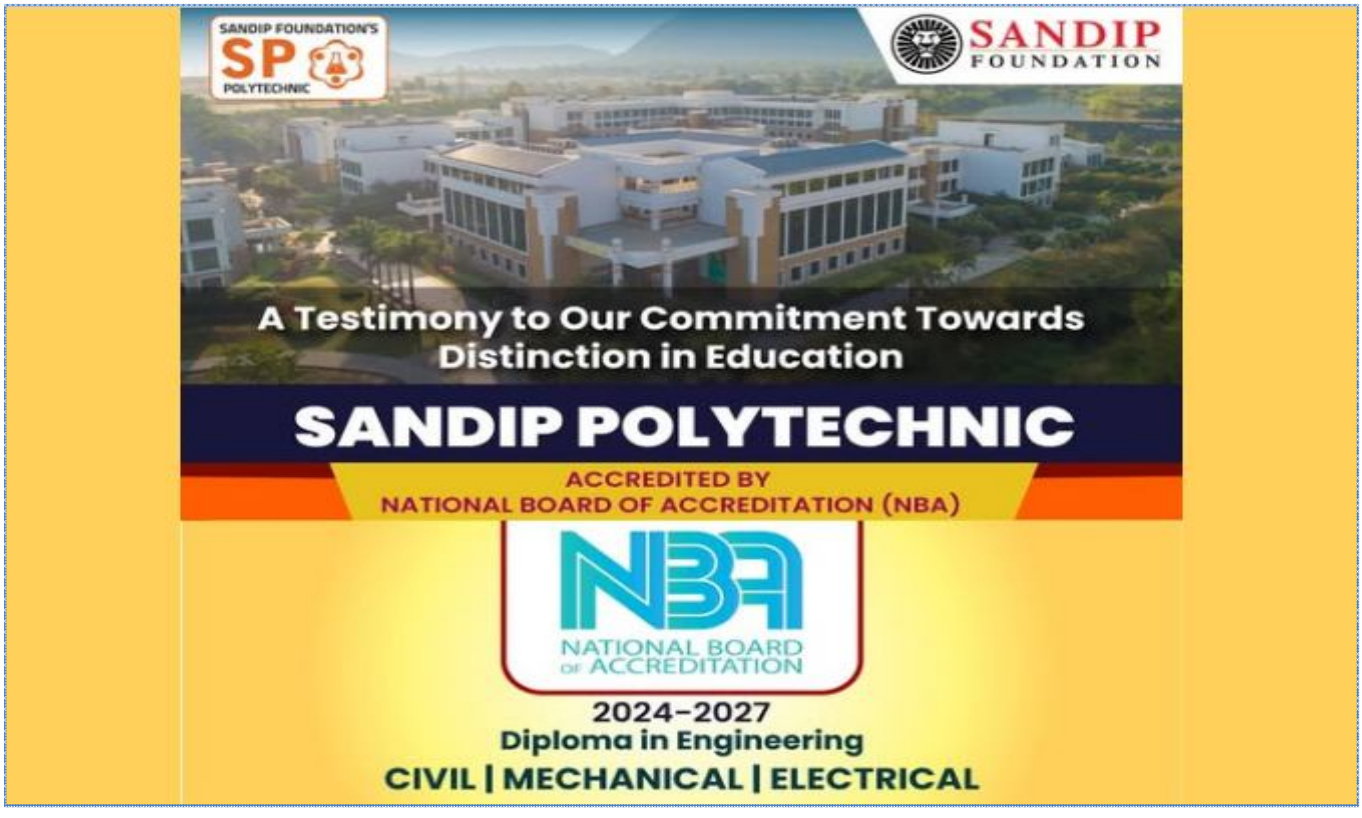
OBE-HANDOUT FOR STUDENTS



(For Circulation at Sandip Polytechnic only)

Outcome Based Education:

Outcome Based Education (OBE) emphasize on what students will be able to do at the end of the programme. The OBE prepares students for life-long learning by developing many abilities required for 21st century rather than gaining knowledge and skills on discrete and department wise course contents.

Sandip Polytechnic in affiliation with Maharashtra State Board of Technical Education has adapted Outcome-based education (OBE) philosophy as advocated by National Board of accreditation (NBA).

The OBE PHILOSOPHY comprises of 5D approach, Define the outcome, Develop the curriculum, Deliver the Instructions, Document the result and Define the future course of action for improvement.

Key Constituents of Outcome Based Education:

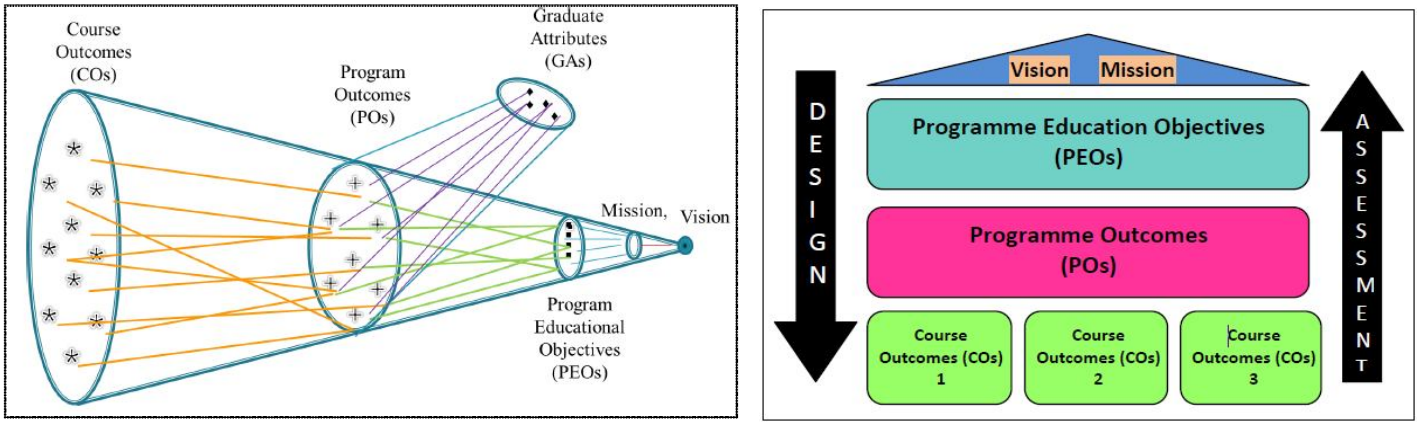


Figure 01. Key Constituents of OBE

Institutions Vision & Mission: Institutions and Programs need to decide a short-term goal as well as long-term goal in terms of students' learning outcomes, their personal growth, skill development, and institution's overall performance.

VISION AND MISSION OF SANDIP POLYTECHNIC:

Vision

- To produce skilled technocrats for serving industry, society and pursue higher education.

Mission

- **M1:** To provide state-of-the-art infrastructure, qualified and competent teaching faculty.
- **M2:** To provide industry institute interaction, employability enhancement and higher education.
- **M3:** To provide platform for development of professional, social skills and lifelong learning.

VISION & MISSION OF THE PROGRAM (For Mechanical Engineering):

Vision

- To develop skilled Mechanical Engineers to meet the needs of industry and society.

Mission

- **M1:** To impart quality technical education to enhance technical knowledge, skills and higher education capabilities.
- **M2:** To depute students for in plant training through industrial institute interaction to learn technology advances.
- **M3:** To develop lifelong learning and social attitude in students to serve society.

Graduate Attributes (GA's): Graduate attributes are the high-level qualities, skills, and understandings that students are expected to develop during their program at institute, which extend beyond their specific subject knowledge and are transferable to future careers and life.

Program Educational Objectives (PEOs): Program educational objectives (PEOs) specify the expected outcomes of students once they complete their program, mostly the way they conduct their behavior & ethics and excel in their careers.

The Sandip Foundations' Sandip polytechnic follows the curriculum developed by the Maharashtra State Board of Technical Education, and PEOs of the each program are provided during the curriculum development only.

Program Educational Objectives (PEOs) of the Program (Mechanical Engg):

PEO1: To provides socially responsible, environment friendly solutions to Mechanical engineering related broad-based problems adapting professional ethics.

PEO2: To adapts state-of-the-art Mechanical engineering broad-based technologies to work in multi-disciplinary work environments.

PEO3: To solves problems and communicates effectively, individually and as a team member in the field of Mechanical Engineering

Program Outcomes (POs): Program outcomes can be defined as the objectives achieved at the end of program. As per the National Board of Accreditation (NBA) self-assessment report (SAR), there are seven different POs (as mentioned below) covering different aspects of providing engineering diploma education. These POs rigorously assess the quality of engineering education offered by different programs.

PO1: Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

PO2: Problem analysis: Identify and analyze well-defined engineering problems using codified standard methods.

PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyze individual needs and engage in updating in the context of technological changes.

Course Outcomes (COs): Course outcomes are the outcomes that are achieved at the end of any course in a semester. For instance, if a student is studying a particular course then, the outcomes would be concluded on the basis of the marks achieved in the theory and practical assessments. Example of COs –

Course Name: Strength of Materials		Course Code: 313308
CO1	Calculate the M.I. of the given object using relevant formulae & methods.	
CO2	Analyze the structural behavior of the given structural components under various loading conditions.	
CO3	Draw SFD and BMD for the given structural element under given loading conditions.	
CO4	Determine the bending and shear stresses in beams under different loading conditions	
CO5	Analyze the direct & bending stresses in the structural members under eccentric loading conditions.	

Outcome Based Education Philosophy:

The framework required for implementation of OBE:

- Outcome Based Education (OBE): A complete awareness about Outcome Based Education Philosophy
- Outcome Based Curriculum (OBC): What students should be able to do?
- Outcome Based Teaching learning (OBTL): Making the students to achieve the outcomes.
- Outcome Based Assessment (OBA): How to measure, what the students has achieved?

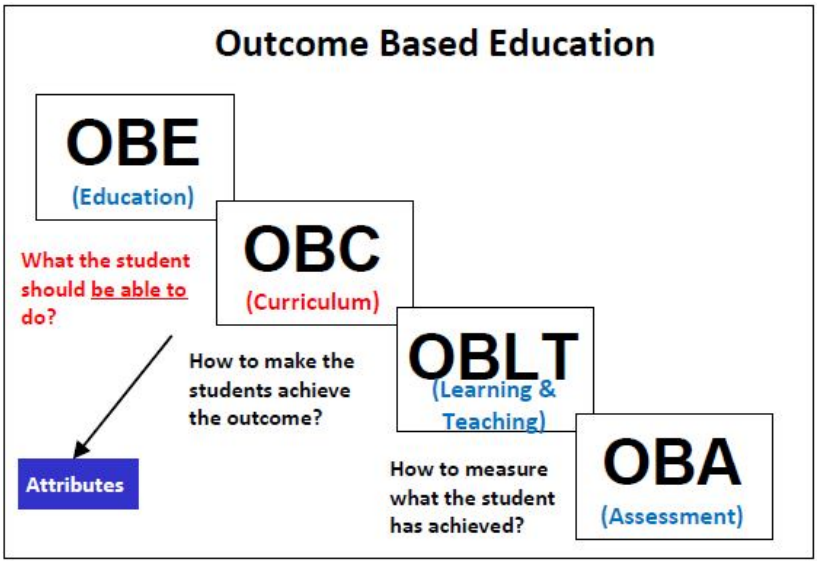


Figure 2: Outcome Based Education Framework

1. **Outcome Based Education:** Outcome Based Education (OBE) is an education approach that focuses on the graduate attributes or outcomes after completing an academic Program. Outcome based approach means knowing what you want to achieve and then taking the steps to do so.

2. **Outcome Based Curriculum (OBC):** An outcomes-based curriculum (OBC) model provides direction and guides students on what learning is important at a particular stage or phase. This enables students to define their learning needs; enables teachers to locate their teaching and assessment in relation to the whole; and offers program designers a basis for continuous quality control of the curriculum through assessment design and curriculum evaluation.

3. **Outcome Based Learning Teaching (OBLT)**: OBTL is a student-center approach for the delivery of educational programs. The curriculum topics in courses are expressed clearly as the intended outcomes for students to achieve. Teaching is then designed to directly facilitate students to achieve those

outcomes. Assessment tasks address what students are supposed to learn and achieve as well. In this approach, teachers act as facilitators, and students should take responsibility and participate actively.

Learning is a relatively permanent change in behavior potentiality that results from reinforced practice or experience. Benjamin Bloom (1948) developed classifications of intellectual behavior and learning in order to identify and measure progressively sophisticated learning.

Bloom's Taxonomy: It is a categorization that defines different levels of intelligence including thinking, learning and understanding. Institute makes use of bloom's taxonomy to improve curriculum, assessments, and teaching methods.

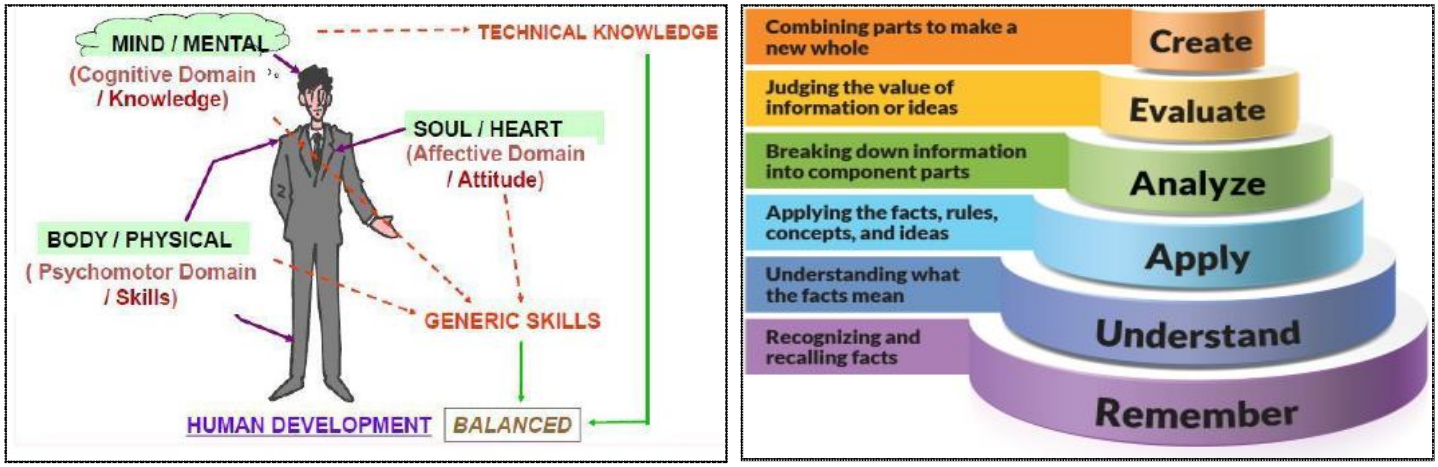


Figure 3: Learning Domains and Levels of Bloom's Taxonomy

Three Learning Domains of Bloom's Taxonomy:

I) Cognitive Domain: In the cognitive domain of Bloom's taxonomy, the major focus is given to the development of knowledge and intellectual skills. As per the complexity, there are six sub-heads of the cognitive domain.

II) Affective Domain: This domain of Bloom's taxonomy deals with the feelings and the emotions associated with the passage. It contains complex ideas and conscience, phenomena, and characters. The main aspects of the affective domain are as follows.

III) Psychomotor Domain: The psychomotor domain of bloom's taxonomy deals with coordination, sensory organ movement, and the physical movement of the body of a student. A great practice is required to be good at these skills. The physical act of driving, playing the keyboard, guitar, is major examples of the psychomotor domain.

4. **Outcome Based Assessment (OBA):** Outcome Based Assessment is the process of developing the appropriate assessments for the learning outcomes as well as conducting some necessary activities to make the assessments transparent, valid, and reliable. OBA plays a critical role in OBE since without the presence of transparent, valid, reliable assessments, it would not be possible to tell what and how the students have achieved with respect to the pre- determined learning outcomes.

Assessment and evaluation are not to prove but to improve. Assessment and evaluation of students should be in tune with program outcomes (POs) and course outcomes (COs) of program and every individual course.

The Evaluation and assessment scheme are mentioned in the individual course curriculum along with specification table comprising of Bloom's Taxonomy levels.

Methods of Assessment

There are basically two types of assessment methods to gather evidence of student learning. The assessment should be done through direct and indirect method as given below.

1. Direct assessment: A direct assessment method is based on a sample of actual student work. Direct assessment consisting of following heads.

1. Theory

- Summative Assessment (SA-TH)
- Formative Assessment (FA-TH): Consists of Formative Assessment Tests.

2. Practical

- Summative Assessment (SA-PR)
- Formative Assessment (FA-TH): Consists of Formative Assessment Experiments

3. Self Learning Assessment (SLA): Consists of Assignment/ micro projects etc

2. Indirect assessment: In order to ensure the achievements of COs, POs and PEOs below mentioned indirect assessment tools are used.

An indirect assessment is based upon a report of perceived student learning. Following feedbacks are used for indirect assessment.

1. Course Exit survey 2. Program Exit survey 3. Parent Survey 4. Alumni Survey 5. Employer survey

Ensuring the achievements of outcomes (CO/PO Attainment Process)

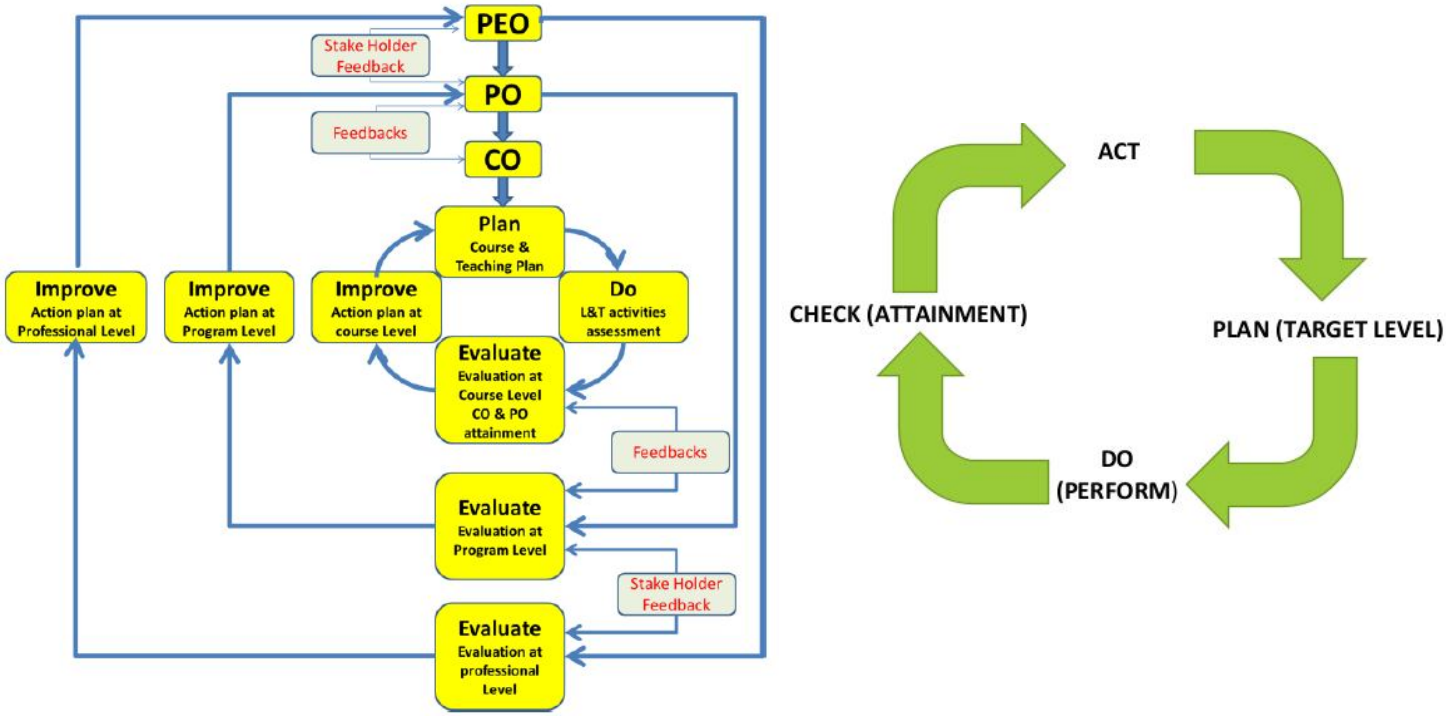


Figure 4: Process to ensure the achievements of outcomes

Closing the loops through continuous Improvements: At Sandip Polytechnic, we are striving for continuous improvements through PDCA cylcle enhancing all the processes for better outcomes.

We at Sandip Foundations Sandip Polytechnic are committed to provide BEST Implementation of OBE Philosophy that will ensure academic excellence as well as all around development of our valued Students.