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2.6. Student Performance and Learning Outcomes

2.6.1 The institution has stated learning outcomes (Program and Course outcomes), graduate attributes, which are integrated into the assessment process and widely published through the website and other documents, and the attainment of the same is evaluated by institution.

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Process used for defining various outcomes

Sushant University
SCHOOL OF ENGINEERING & TECHNOLOGY

Process of Defining PEOs, POs, PSOs, and COs at the School of Engineering & Technology

Introduction

The process of defining **Program Educational Objectives (PEOs)**, **Program Outcomes (POs)**, **Program Specific Outcomes (PSOs)**, and **Course Outcomes (COs)** at the School of Engineering & Technology ensures alignment with its **vision and mission**, regulatory guidelines, industry demands, and stakeholder inputs. The structured framework ensures the development of competent engineering professionals across programs like Computer Science Engineering, BCA and MCA. It integrates theoretical knowledge, practical skills, and ethical awareness to prepare students for global and local technological challenges.

1. Vision and Mission

Vision:

"Achieving excellence in higher education through research, Innovation, participatory governance and global presence."

Mission:

- Transform lives and communities through education and research
- Achieve excellence through participatory governance and focus on quality research and innovation
- Attract talent through international partnerships and collaborations to achieve highest standards
- Facilitate learning through student centric and empathetic approach
- Develop thought leadership with industry integration

2. Steps to Define PEOs, POs, PSOs, and COs

A. Understanding the Curriculum Framework

- **Review Accreditation Standards:** Followed guidelines from bodies such as UGC, AICTE, and NBA.
- **Engage Stakeholders:** Consulted faculty, students, alumni, employers, and industry experts.
- **Competency Development:** Balanced theoretical knowledge with practical skills for engineering practice.

B. Developing Program Educational Objectives (PEOs)

- **Stakeholder Feedback:** Incorporated inputs to define essential graduate competencies.
- **Alignment with Vision and Mission:** Ensured relevance to engineering advancements and institutional goals.
- **PEOs Example:**
  - Prepare engineering professionals with technical expertise and leadership skills.
  - Promote a culture of research, innovation, and ethical responsibility.
  - Foster lifelong learning and adaptability to technological advancements.

C. Defining Program Outcomes (POs)

- **Core Competencies:** Addressed key skills like technical proficiency, problem-solving, communication, and teamwork.
- **Bloom's Taxonomy:** Defined outcomes at knowledge, application, and analysis levels.

POs Example:

- Demonstrate proficiency in using advanced engineering tools and software.
- Communicate effectively with teams and stakeholders.
- Apply ethical principles to ensure safety and sustainability in engineering practices.

D. Identifying Program Specific Outcomes (PSOs)

- **Specialized Competencies:** Each program (e.g., Computer Science, Mechanical, Electrical, Civil Engineering) emphasized unique skills, such as system design, problem-solving, and innovation.

PSOs Example:

- **PSO1:** Apply software engineering practices to develop real-time software projects using open-source or commercial environments for organizational success.
- **PSO2:** Design and develop systems in areas like algorithms, networking, web design, cloud computing, IoT, and data analytics.
- **PSO3:** Stay updated with industry/research trends and innovate solutions to existing problems.

E. Creating Course Outcomes (COs)

- **Analyze Course Content:** Identified specific skills and knowledge for each course.
- **Measurable Learning Objectives:** Used action verbs like "analyze," "apply," and "evaluate" for clarity.
- **Align with POs and PSOs:** Ensured each course contributed to program-level outcomes.
- **CO Example:**

B.Tech Computer Science:

CO1: Understand software development methodologies and life cycles.

CO2: Apply programming languages and frameworks in real-world applications.

BCA:

CO1: Understand computer fundamentals and database management.

CO2: Develop software solutions using different programming languages.

MCA:

CO1: Analyze complex computing problems and design solutions using advanced algorithms.

CO2: Develop and manage software applications in the fields of networking, cloud computing, and big data.

3. Assessment and Continuous Improvement

- **Assessment Methods:**
  - Written exams, lab evaluations, and community service projects.
  - Industry internships for real-world experience.
- **Feedback Loops:** Regularly updated based on input from industry experts, alumni, and academic bodies.
- **Quality Assurance:** IQAC ensures compliance with institutional and global standards.

This process ensures that the School of Engineering & Technology delivers dynamic, industry-relevant education, producing skilled and ethical engineering professionals equipped to meet global standards.

School of Engineering & Technology

Sushant University

Steps Followed During Curriculum Development at the School of Engineering & Technology

1. **Assessment**
    - Consulted faculty, students, alumni, and industry professionals.
    - Analyzed market trends to identify emerging technologies in engineering.
    - Reviewed curriculum gaps to align with evolving industry and technological needs.
2. **Define Program Goals and Outcomes**
    - Developed vision and mission statements for engineering programs.
    - Outlined desired graduate attributes like technical expertise, ethical values, and teamwork.
    - Established program and course outcomes aligned with global engineering standards.
3. **Regulatory Compliance**
    - Ensured alignment with guidelines from regulatory bodies like the University Grants Commission (UGC), AICTE, and NBA.
    - Integrated standards from accreditation agencies to meet professional requirements.
4. **Curriculum Design**
    - Structured programs with a balance of core, elective, and practical courses:
        - **Core Areas:** Programming, Data Structures, Algorithms, Databases.
        - **Electives:** AI, Machine Learning, Cloud Computing, Cybersecurity.
        - **Practical Training:** Labs, internships, capstone projects, and industry-based assignments.
    - Defined course credits and instructional hours in line with academic regulations.
5. **Integration of Modern Trends**
    - Incorporated emerging topics like AI, Data Science, IoT, and Cloud Computing.
    - Designed interdisciplinary courses blending technology with management and innovation.
    - Introduced global perspectives through international case studies and industry standards.

6. • **Pedagogical Strategy**
    - Adopted innovative teaching methodologies:
        - **Interactive Learning:** Case discussions, simulations, and workshops.
        - **Experiential Learning:** Hands-on training, community outreach, and internships.

Emphasized skill development in programming, problem-solving, research, and technical communication.

7. **Assessment Framework**
    - Defined a multi-faceted assessment strategy:

        - **Formative Assessments:** Quizzes, assignments, and group discussions.
        - **Summative Assessments:** Theory and practical exams, research projects.
        - **Practical Evaluations:** Lab work, internship reports, and project presentations.

8. **Feedback Mechanism**
    - Collected input from faculty, students, and industry experts on the draft curriculum.
    - Incorporated feedback to refine and enhance course content and learning outcomes.

9. **Approval Process**
    - Presented the finalized curriculum to the Board of Studies (BOS) and Academic Council for approval.

10. **Implementation**

- Rolled out the curriculum with an academic calendar and teaching resources.
- Conducted faculty training workshops to familiarize staff with updated methodologies and technologies.

11. **Continuous Review and Revision**

- Established a periodic review mechanism to ensure courses remain relevant and updated.
- Incorporated suggestions from alumni, industry experts, and academic professionals for continuous improvement.

This systematic approach ensures that the curriculum remains dynamic, relevant, and aligned with the needs of students, industry, and society.