

# PANIMALAR ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to Anna University, Chennai)

## Process for Developing/Revising the Program Curriculum

### 1. Introduction

The objective of the curriculum development is to ensure that the curriculum of **Panimalar Engineering College** (An Autonomous Institution, Affiliated to Anna University, Chennai) is of advance academic excellence, by considering the multiple purposes of higher education as well as achieving its vision and mission. With that objective, curricula at all levels shall produce graduates with the required competencies to contribute to the social and economic advancements of the nation.

This content provides a framework for curriculum development and revision throughout a program's lifecycle that is purposeful and intentional and is student- centered regardless of the mode of delivery.

**The curriculum is revised due to the following reasons and but not limited to:**

- i. Change in the needs of Industry, Academic or Society
- ii. Change Requirement of the students
- iii. Changes in the instructional methods and pedagogy
- iv. Policies and Amendments from the professional bodies like UGC, AICTE
- v. Amendments from the affiliated university (i.e. Anna University)
- vi. Changes in the region, National and International educational landscape

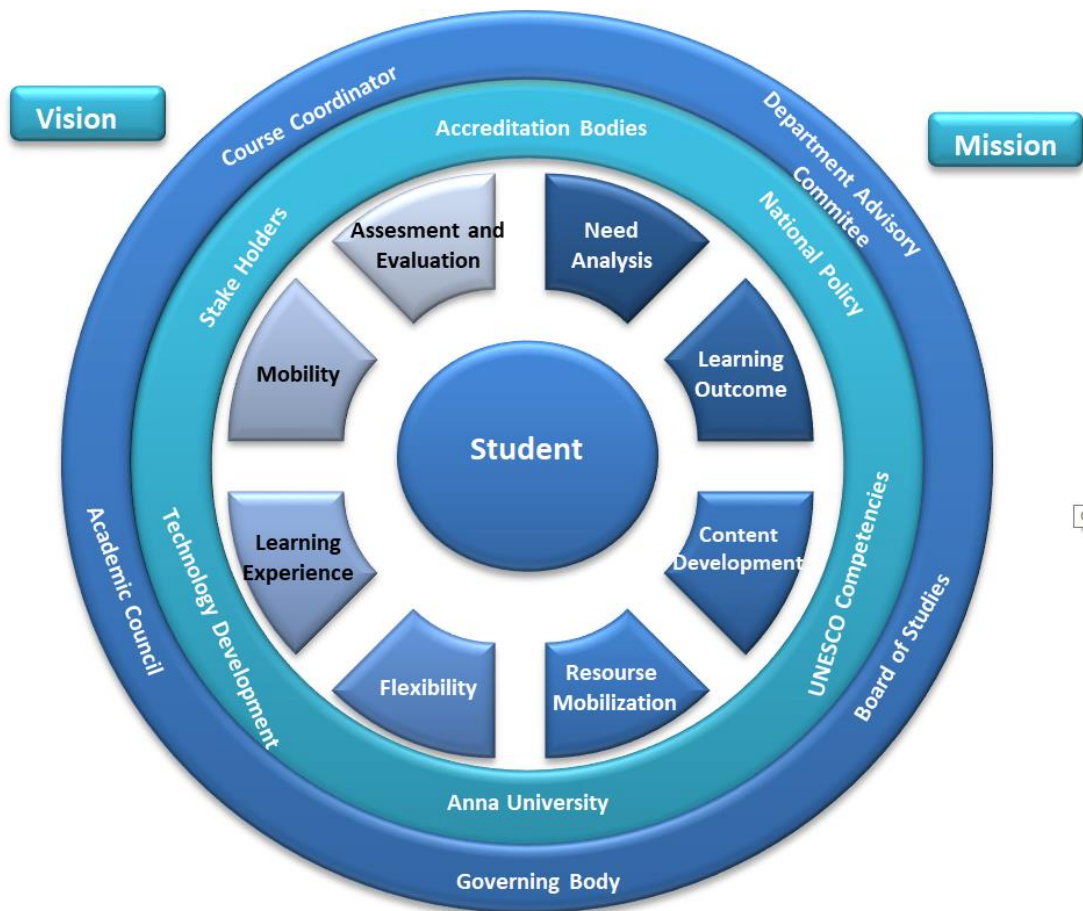
**The Curriculum of Panimalar Engineering College ensures:**

- i. Consistency with the vision and mission of Panimalar Engineering College.
- ii. Student Centered Learning
- iii. Outcomes-based with course content, learning resources, learning activities, assessment, and evaluation; such that all are derived from, and aligned with, program outcomes (POs) and course outcomes (COs).
- iv. Complies with the policies and standards of National Educational Policy, UNESCO Competencies for SDGs, Model Curricula of AICTE & Affiliated University and regulatory bodies.

### 2. Design and Development of student-centered curriculum

Figure 1.2.1 depicts the illustration of the Design and Development of a student-centered curriculum. The curriculum design strictly adhere the vision and mission of the institution. The necessity of the Revision and Redesign of the curriculum depends on the Stakeholders' Feedback Mechanism, National Education Policy, Regulatory Bodies, Accreditation Boards, Professional Societies, Industrial Experts, etc. The implementation, monitoring, and approval process of the curriculum design and development is carried out by the Academic Council, Board of Studies, IQAC, Department Advisory Committee,

Course Coordinator. The curriculum delineates the Learning Outcomes, Learning Experiences, Flexibility, Mobility, Assessment & Evaluation, Resource, and Content development.



**Figure 1.1 Design and Development of student-centered curriculum**

### 3. Need Assessment and Analysis in Curriculum Development

Need assessment is the basic element of curriculum design, development, and revision. The needs assessment identifies the key competencies, desirable characteristics, and desirable learning experiences in the curriculum development process. The need assessment is based on the following:

- i. Policy Revision at the National Level
- ii. Affiliated University (Anna University)
- iii. Statutory and Regulatory Bodies
- iv. Accreditation Bodies
- v. UNESCO Curriculum competencies
- vi. Stakeholders Feedback

#### i. National Education policy

The curricula place a strong emphasis on encouraging interdisciplinary study, offering

novel subjects, and giving students access to new opportunities and flexible course options. The curricula cover the following fundamental principles of NEP:

- a. Internationalization
- b. Holistic & Multidisciplinary Education
- c. Autonomy and Accountability
- d. Research and Innovation
- e. Curriculum flexibility and Credit Transfer
- f. Digitalization of the Teaching – Learning Process
- g. Skill Development
- h. Encouragement to use Indian Languages

## **ii. Affiliated University (Anna University)**

The curriculum is based on the Curriculum of the Anna University, Chennai. The curriculum is as per the regulations and the amendments of the university.

## **iii. Statutory and Regulatory Bodies:**

The curricula of the Engineering and Technology programs offered at Panimalar Engineering College have the essential aspects as in Learning Outcomes- based Curriculum Framework of University Grant Commission (UGC) and compliant with the mandates described in the model curricula of AICTE.

## **iv. Accreditation Bodies**

NAAC expects institutes to include courses in the curriculum that focus on fostering skills in students that would prove to be beneficial for them in the future. It should also lean towards specific skill development and creating entrepreneurship capability.

On the other hand, the NBA emphasises a curriculum design balanced with having core concepts depending on particular subjects.

## **v. UNESCO Curriculum competencies**

The Curriculum adheres the various competencies suggested by UNESCO like Lifelong learning, Self-agency, Interacting with others, interacting with the world, Interacting with diverse tools and resources, Transdisciplinarity and Multi- literateness.

The various UNESCO competencies are:

- Lifelong learning (curiosity, critical thinking, ever-seeking)
- Self-agency (entrepreneurship, responsibility, self-worth, creativity, grit)
- Interacting with others (respect, open-mindedness, sensitivity, followship, fellowship leadership)
- Interacting with the world (environmental custodianship, being glocal)
- Interacting with diverse tools and resources (using technology and available resources creatively, wisely, ethically, and sustainably)

- Transdisciplinarity (thinking through and across epistemes and systems, making connections, finding solutions to global problems)
- Multi-literateness (intercultural literacy, health literacy, scientific literacy, data literacy, financial literacy, numeracy, general literacy)

#### **vi. Stake Holders Feedback**

Feedbacks from Students, Faculty, Parents, Alumni and Employer are considered for continuous improvements in curriculum and other academic aspects. The ultimate goal of stakeholder's feedback is to get useful insights for the purpose of improvement in all aspects of teaching, learning, assessment and infrastructure facilities.

Inputs collected from all the stake holders are analyzed and put forth in Board of Studies (BoS) for approval. After getting approval in BoS, the curriculum with the incorporation of recommended changes if any is sent to Academic Council for their final endorsement.

### **4. Learning Outcomes and Learning Experience**

**Learning outcomes (LO)** are specific statements that define what a learner is expected to achieve by the end of a learning activity, course, or program. They describe the knowledge, skills, abilities, or attitudes a student should acquire and demonstrate after instruction.

The LO should be specific and clear, Measurable, Achievable, Relevant and Time-bound. The LO should inform both the learning experience and guide the assessment process. The categories of Los are: Program Outcomes (POs), Program Specific Outcomes (PSOs) and Course Outcomes (COs).

Program Outcomes are broad statements that describe what a student is expected to achieve by the end of a specific educational program. The program curriculum should be evolved, considering the Washington Accord Knowledge and Attitude Profile (WKs) and the Program Outcomes (POs) defined by the NBA.

**Course Outcomes** are specific statements that describe what a student will achieve upon completing a particular course or module. They focus on what students will learn, understand, and be able to do after instruction in that course.

Course Outcomes should align with Program Outcomes to ensure a coherent and purposeful learning experience. The Course Outcome shall be statements of 03 to 06. The combination of well-designed Course Outcomes across a program should collectively enable students to achieve the Program Outcomes upon graduation.

Further, the Program Outcomes and Course Outcomes should be in line with the vision and Mission of the Department and Institution. The POs and COs must be mapped with necessary measurable tools, so that the student could demonstrate their Learning Experiences. The mapping keywords must be correlated with the Bloom's Taxonomy. The Learning

Outcomes influences the assessment, curriculum adjustment, student feedback and Accountability.

**Learning Experiences (LE)** encompasses hands-on application, real-world problem-solving, teamwork, innovation, and reflection. They are essential for preparing students for the complex, interdisciplinary nature of engineering practice. The Learning Experience depends on the Learning Outcomes and goes in line with it. The LEs is manifested in Laboratory experiments, Projects, Internships, Problem solving, Workshops, Seminars and Usage of tools for modelling and simulation. The LE leads to the development of technical competence, critical thinking, collaboration skills, Hands-on experience, problem solving ability and professional preparedness. These experiences allow students to not just learn engineering concepts but to integrate knowledge, develop skills, and become innovative thinkers capable of addressing the multifaceted challenges of modern engineering practice

## **5. Flexibility and Mobility in Curriculum Development**

**Flexibility and Mobility** are essential concepts in modern education, designed to make learning more adaptable, student-centered, and responsive to individual needs, technological advancements, and societal changes. Both principles ensure that educational systems and curricula are not rigid or one-size-fits-all but rather dynamic, inclusive, and adaptable to a variety of learning contexts.

**Flexibility** refers to the capacity of a curriculum to adapt to diverse learning needs, interests, learning paces, contexts, and changes in the educational environment. A flexible curriculum allows adjustments to learning pathways, content, methods, and assessment strategies to accommodate the varying needs of learners, educators, and circumstances. The flexibility is on content, pedagogy, Assessment and Duration of study. The flexibility is adopted through online courses, internships, Value Added Courses, Vertical based curriculum, enrollment for minor degree, Flexibility to add or drop courses, Choice of professional elective courses and advancement courses.

**Mobility** refers to the ease with which students, educators, or programs can transition between different levels of education, institutions, disciplines, or even countries while maintaining the continuity and comparability of their learning outcomes. This concept focuses on creating pathways that allow learners to move seamlessly across educational settings and levels without significant barriers. The mobility is experienced through credit transfer system, inter disciplinary programs, certification and internship.

## **6. Assessment and Evaluation**

Performance in each course of study shall be evaluated based on (i) continuous internal assessment throughout the semester and (ii) End Semester examination at the end of the semester. The evaluation shall be based on Outcome Based Education (OBE) and the relevant rubrics shall be followed. The weightage for the continuous assessment and end semester examination is given in the Table 1.2.1. Appearance in End Semester Examination is mandatory for all courses except the courses evaluated only by 100% continuous assessment.

**Table 1.1. Weightage of Marks for Continuous Assessments and End-Semester Examinations**

Category of Course	Continuous Assessments	End semester Examinations
Theory Course	40 %	60 %
Theory Course with Laboratory component	50 %	50 %
Laboratory Course	60 %	40 %
Project Work	60 %	40 %
Mandatory Course, Value Added Course, Mini-Project, Seminar / Case study / Creative and Innovative Project, Industrial / Practical Training, Summer Project, Internship	100%	-

The Theory Courses, Theory courses with laboratory component, Laboratory Courses and Employability Enhancement Courses. Employability Enhancement Courses include Project Work, Seminar, Professional Practices, Case Study and Industrial/Practical Training; Mandatory courses shall be evaluated for a maximum of 100 marks. In case of Theory courses with Laboratory component, weightage of marks for the Theory and Laboratory components in the continuous assessments and End-Semester Examination for different types of courses shall be as in Table 1.2.2.

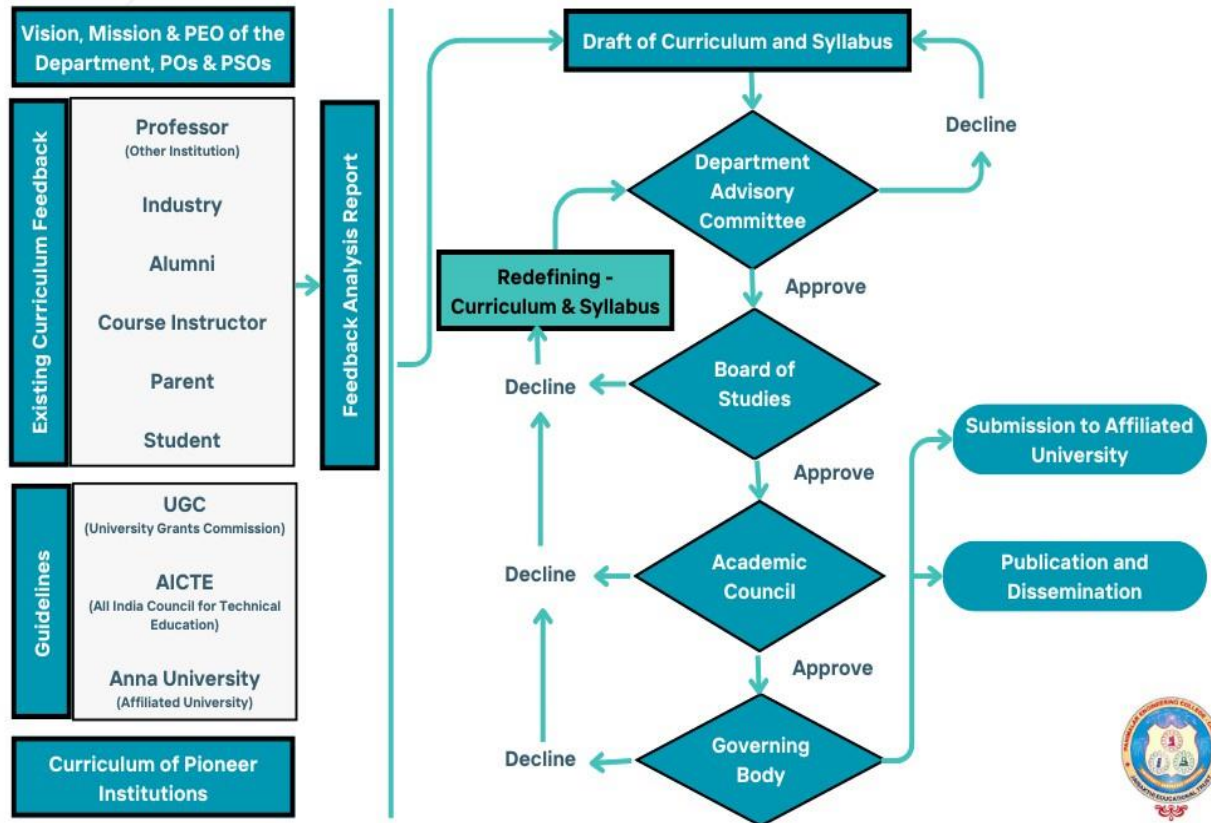
**Table 1.2: Weightage of marks for the Theory and Laboratory components in the continuous assessments and End-Semester Examination for different types of courses**

L	T	P	C	Continuous Assessment Theory	Continuous Assessment Laboratory	End-Semester Examinations
1	0	2	2	40 %	60 %	50% Laboratory Only
1	0	4	3	40 %	60 %	50% Laboratory Only
2	0	2	3	40 %	60 %	50% Theory Only
3	0	2	4	40 %	60 %	50% Theory Only
2	0	4	4	40 %	60 %	25% Theory and 25 % Laboratory
3	0	4	5	40 %	60 %	25% Theory and 25 % Laboratory

## 6. Curriculum Design, Development and the Updating Process:

Process diagram:

### DESIGNING THE CURRICULUM



**Figure 1.2 Designing the Curriculum**

Based on the need analysis and assessment the curriculum and syllabus is drafted. The Committees for the approval of the curriculum and syllabus shall be constituted as per the UGC norms and as well the affiliated university regulation, which includes Governing Body (GB), Academic Council (AC), Board of Studies (BoS) and Department Advisory Committee (DAC). The requirement of curriculum revision/redesign or curriculum for the new programme evolves from the need analysis and the expectation of stakeholders, Government bodies (State and Central) and UNESCO competencies. The curriculum design, development and update process is as shown in Figure 1.2.2. The course coordinators would provide sufficient inputs after the need analysis that is needed to draft curriculum revision/redesign. The Head of the Department would propose the draft curriculum revision/redesign to the DAC for evaluation. After the DAC recommendation, the curriculum, course contentment and evaluation shall be placed at BoS for consideration. After the BoS recommendation, the curriculum, course contentment and evaluation shall be placed at the Academic Council for consideration. After the Academic Council and Governing Body approval, the curriculum shall be submitted to the affiliated university and Published.

## 7. Outcome Attainment

**CO attainments** is measured based on the direct attainment and indirect attainment. Direct attainment of COs is determined from the performances of students in Continuous Internal Evaluation (CIE) and End Semester Examination (ESE).

**Continuous Internal Evaluation (CIE)** is conducted and evaluated by the department. Thus, the department have access to question-wise marks in all assessment instruments in CIE. When questions are tagged with relevant COs, the department has access to performances of students with respect to each CO.

**End Semester Examination (ESE)** is conducted and evaluated and the Office of the Controller of Examinations awards the grade point based in the relative grading. Thus, the departments get only the grades of the students in ESE and not the exact marks.

**Indirect method** such as course end survey is used to measure the students understanding about the subject and calculated based on the rubrics framed. The frequency of evaluation is once in a semester.

The POs and PSOs are evaluated based on the Direct and Indirect Assessment. The evaluation tools of the indirect assessment are: Program Exit Survey (Yearly/ End of the program), Employer Survey (Once in a year) and Alumni Survey (Once in a year).

**The steps involved the CO, PO and PSO attainment computation are:**

**Step 1.** Consider the CO – PO Articulation Matrix

**Step 2.** Calculation of CO attainment (for the batch) base on Internal Assessment Test

**Step 3.** Calculate the attainment levels based on End Semester Examination.

**Step 4.** Calculation of CO attainment (for the batch) base on indirect assessment tools.

**Step 5.** CO Attainment calculation

**Step 6.** Identification of curricular gap

### **POs and PSOs attainment**

*Program outcomes attained through the attainment of COs.*

**Step 7.** POs and PSOs attainment:(Direct)

**Step 8.** POs-PSOs attainment:(Indirect)

**Step 9.** POs and PSOs Attainment

**Step 10.** PO&PSO Attainment Gap Analysis