Government Polytechnic Kolhapur

Curriculum Philosophy

(MPEC2023 Outcome based Curriculum)

Preface

The quality of technical education is dependent on a well-developed curriculum. The curriculum should not focus only on technical contents, but it should impart necessary skills that help students to learn how to cope with new challenges. It should prepare them for lifelong learning once they enter the workforce. It is very necessary that the diploma students should be well updated with the latest technological skills and advancements, to meet industrial demands and contribute to nation building. With this thought we have designed outcome-based curriculum keeping in view the latest industry trends and market requirements. Outcome based curriculum designed with reference to NEP2020 and MSBTE K Scheme will be offered to students 2023 onwards. Outcome based curriculum is student centric rather than teacher centric. It is comprised of basic science and engineering having focus on fundamentals, significant discipline level courses and electives. Six-month Implant training is also included in the curriculum to make the student understand industry requirements, have hands on experience and take up project work relative to industry in their final year. These features will allow the students to develop problem solving approach to face the challenges in real life.

In outcome-based education, Programme Outcomes, Programme specific outcomes, Course outcomes are defined first and then course contents are designed to achieve these outcomes. During curriculum implementation the teacher will analyze the contents and then develop the learning experiences which will ensure accomplishment of outcome. The industry experts, being main stake holders are actively involved, while designing the curriculum. Outcomes are validated by industry experts, so it will produce industry ready pass outs and increase the employability of students.

Salient features of this curriculum are

- Outcome based curriculum with well-defined outcomes for each course
- Incorporation of six-month Implant training
- Built in flexibility for the students in terms of elective courses
- Course on Entrepreneurship and Start-up to encourage entrepreneurial skills
- More weightage for practical's in terms of contact hours to increase skill component
- Incorporation of courses such as Yoga, Social and life skills in curriculum
- Self-learning hours are added in curriculum to inculcate self-learning capability in students.

- A list of experiments with clear outcomes.

The New Curriculum has been designed to better meet the needs of industry, considering evolving technological trends and implications for the engineering workforce. This curriculum is also expected to enhance employability skills and develop well trained Diploma Engineers who have the knowledge and the skills to get engineering solutions for real-world problems.

I gratefully acknowledge the time and efforts of all those who contributed to design the curriculum, especially the contributions of chairperson and members of Governing Body, Board of Studies and Programme-wise Board of Studies. I acknowledge all the stake holders, alumni and subject experts.

(Capt. Dr. N. P. Sonaje)
Principal
Government Polytechnic Kolhapur

Outcome Based Education Philosophy

As the National Board of Accreditation (NBA)is focusing on the adoption of Outcome Based Education (OBE) approach, Government Polytechnic, Kolhapur has adopted the OBE approach for design of curriculum MPEC2023 to all programmes. We adopted Outcome based Model because, OBE is "Student Centric" rather than "Teacher Centric". OBE focuses on the graduate attributes or outcomes after completing an academic programme. Outcome based approach means knowing what you want to achieve and then taking the steps to do so. Starting with a clear picture of what is important for students to be able to do and then organizing the curriculum delivery and assessment to make sure learning happens.

Some Benefits of OBE are

1. Satisfying the need of stake holders
2. More specific and coherent curriculum
3. Student centric

Components of the OBE are

1. Outcome based curriculum: What students should be able to do after learning the curriculum?
2. Outcome based Teaching Learning: Prepare and train the students to achieve the outcomes.
3. Outcome based assessment: Measure what the student has achieved? Indentify which outcome has not attained by the students.
4. Remedial measures: Take the remedial measures so that student can achieve that outcome.

Fig1. Outcome Based Education Philosophy

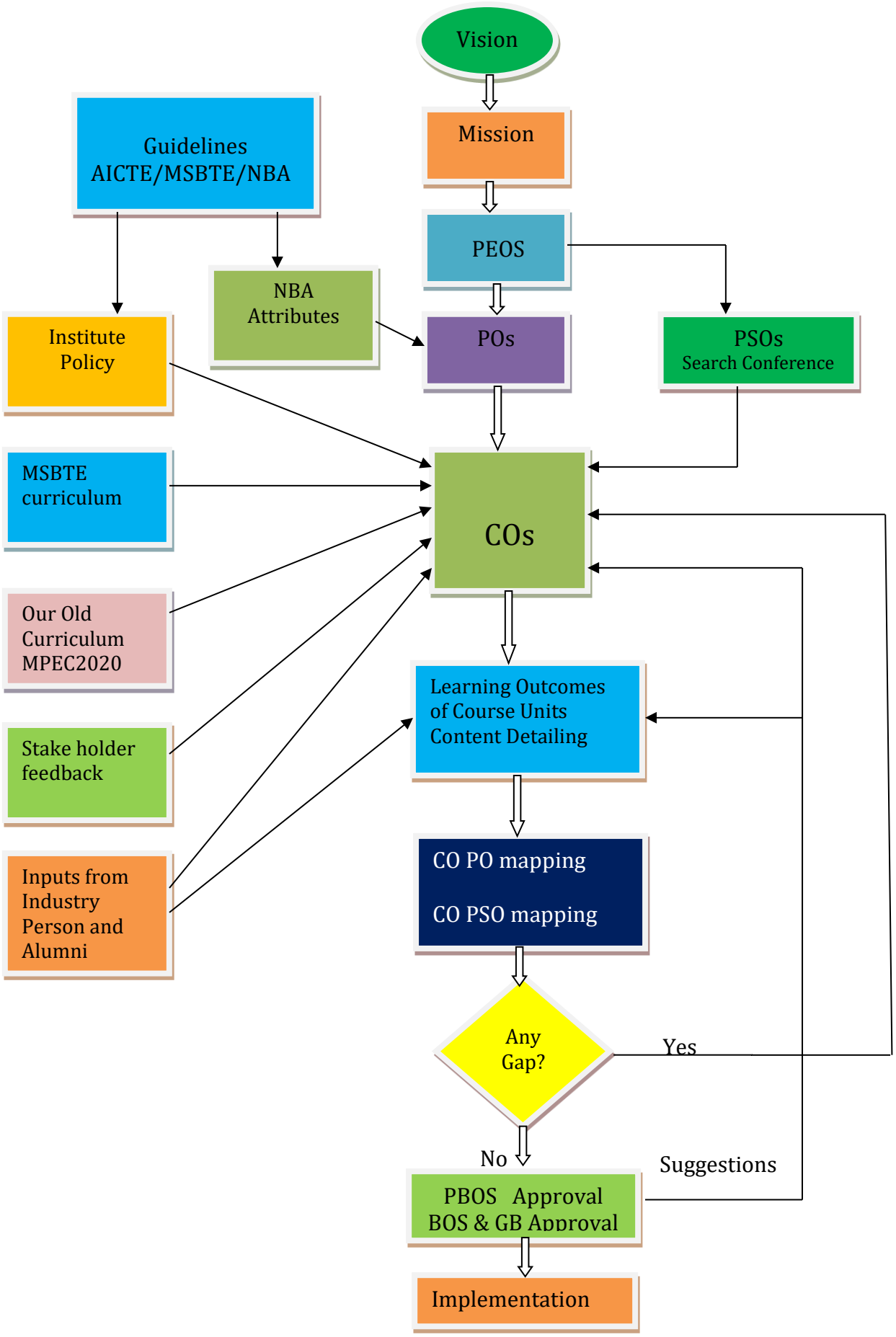


Fig. 2 Curriculum Design Process

Figure 1 shows outcome-based education philosophy. Vision and mission statements are finalized first, and then each programme has finalized Programme educational objectives (PEOs). Programme outcomes (POs) are given by NBA. Each programme has finalized their Programme Specific Outcomes (PSOs). Then course outcomes (COs) are finalized and then content detailing of each course has been carried out.

Figure 2 shows our curriculum design process/philosophy. Important steps are given below. Process starts with formulation of vision mission statements of the institute.

1. Formulation of Vision Mission Statements

Vision Mission statements of the institute are finalized using following steps.

- Bottoms up approach
- Involvement of all stakeholders
- Discussion, Brainstorming sessions among all stake holders
- Gap analysis or SWOT analysis
- Challenges before the institute
- What are the immediate and long-term goals

After following these steps vision and mission statements of the institute are finalized as

Institute Vision

Institute of high recognition to develop competent technicians for quality professional services and entrepreneurship to cater the needs of industry and society.

Institute Mission

- To educate and train in multi-disciplinary multi-level programmes to develop competent technicians and skilled manpower for industrial needs
- To ensure employability, encourage entrepreneurship, promote lifelong learning
- To inculcate in students the qualities of a good citizen at individual, social and professional level

- To provide quality management system with focus on effective student-centric education and high recognition

After finalizing vision mission statements of the institute, using the same procedure vision mission statements of each programmes are finalized.

2. Programme Educational Objectives (PEOs)

The Programme educational objectives of a diploma program are the statements that describe the expected achievements of diploma holders in their career, and also in particular, what they are expected to perform and achieve during the first few years after diploma. The PEOs, may be guided by global and local needs, vision of the Institution, long term goals etc. For defining the PEOs the faculty members of the program have continuously worked with all Stakeholders: Local Employers, Industry, Students and the Alumni

3. Programme Outcomes (POs)

Programme outcomes are given by NBA. They are

1. **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
2. **Problem analysis:** Identify and analyzewell defined engineering problems using codified standard methods**.**
3. **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.
4. **Engineering tools experimentation and testing:** Apply modern engineering tools and appropriate technique to conduct standard test and measurements.
5. **Engineering practices for society sustainability and environment:** apply appropriate technology in context of society sustainability environment and ethical practices
6. **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.
7. **Life-long learning:** Ability to analyze individual needs and engage in updating in the context of technological changes

4. Programme Specific Outcomes (PSOs)

These outcomes are specific to a program in addition to NBA defined POs, namely, Civil, Mechanical, Electrical, Electronics & Telecommunication, Information Technology, Metallurgy .

5. Course Outcomes (COs) and Content detailing

"Statements of observable student actions that serve as evidence of the Knowledge, Skills and Attitudes acquired in a course". Each course is designed to meet (about 4 to 6) Course Outcomes The Course Outcomes are stated in such a way that they can be actually measured. "Blooms Taxonomy" is used for framing course outcomes.

Course Outcome statements are broken down into two main components:

- **An action word** that identifies the performance to be demonstrated;
- **Learning statement** that specifies what learning will be demonstrated in the performance;

Once the COs are finalized, detailing content of each course is done as per the course outcomes. For content detailing inputs are taken from stake holders, MSBTE curriculum and industry persons.

6. CO-PO and CO-PSO mapping

When all COs are finalized, COs are mapped with POs and PSOs. If it is found that particular PO or PSO has not been addressed by any CO, then it is considered as gap. To remove this gap, again COs are modified. This process will repeat till all POs and PSOs are mapped by COs.

7. Approval in PBOS and BOS meetings.

After CO-PO and CO-PSO mapping, content detailing is done. Then the curriculum is kept for approval in Programme wise Board of studies (PBOS) meeting. Each programme has its own PBOS committee whose structure is as follows.

Head of Department concerned	Chairman
Two senior Lecturers	Members
One expert from the neighboring institute	Member
Nominee from the Board of Technical Education	Member
One expert from the local industry	Member
Departmental Curriculum Coordinator	Member Secretary

Suggestions given by PBOS members are incorporated in the curriculum and then it is put in front of Board of studies (BOS). Structure of BOS is as follows.

Representative from Industry	Chairman
Principal	Member
Head of All departments	Member
Local Experts of all programmes	Member
Nominee from the board of technical Education	Member
In charge Curriculum Development Cell	Member Secretary

Suggestions given by BOS members are incorporated into the curriculum and recommendations of BOS committee are kept for approval in Governing Body meeting. After getting approval from Governing Body, curriculum is offered to students from AY 2023-24 progressively.

8. Institute Policies

As per the guidelines given by All India Council of Technical Education (AICTE), Maharashtra State Board of Technical Education (MSBTE), Directorate of Technical Education (DTE) and NBA, Institute policies about curriculum design are decided in the meeting of all Heads of the departments.

Being an autonomous institute, we revise our curriculum after every 3 to 4 years. Earlier it was revised in 2020. Curriculum 2020 was outcome-based curriculum. As per instructions received from MSBTE we revised curriculum in 2023 as per NEP 2020 and MSBTE K scheme. We have conducted search conferences in all departments to identify set of skill components that should be developed in students at the end of the diploma programme. Here we got suggestions from industry experts as well as from stakeholders about incorporation of six-month Implant training in the curriculum itself to give awareness about industry culture to students. So, we incorporated 16-week industrial training in the curriculum. Initially it was kept in fifth semester but as per suggestions received from BOAT, from 2026-27 it will be shifted in sixth semester. Once the curriculum framework is finalized at the institute level, as per the demand of the industry, course contents can be changed at any level without disturbing the framework. This is necessary to satisfy the present demand of industry and remove the curricula gaps as per the advancement in technology.

Credit System

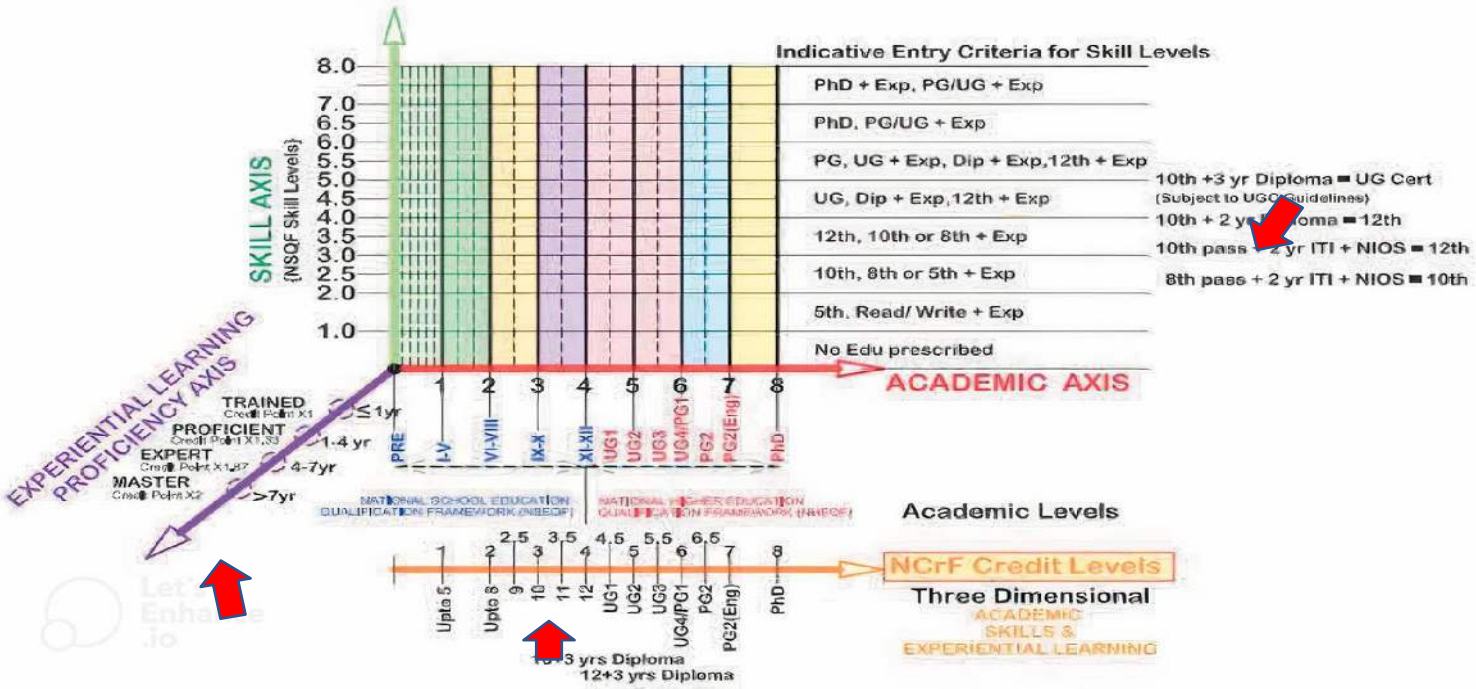
For the award of a Diploma, Students are required to earn 120 credits. **Credit** is the recognition that a learner has completed a prior course of learning, corresponding to a qualification at a given level. In context to NEP 2020, credit refers to a unit of measurement representing the academic workload or the learning outcomes achieved by a student in a particular course or program. It is often used to quantify the amount of time a student is expected to spend on a course, including both contact hours (time spent in class or with an instructor) and self-learning of coursework. Students whose terms are granted and who pass all the heads of a particular course (as per curriculum document), will be said to have earned the credits prescribed for the course.

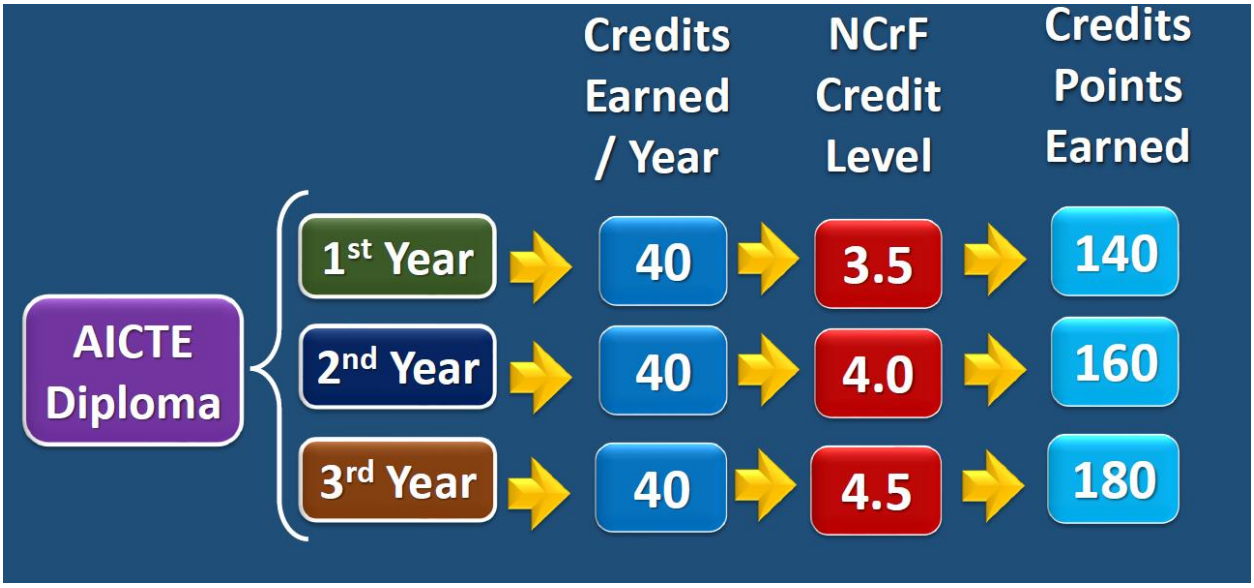
As per NEP2020 and guidelines given by MSBTE, institute is offering MPEC2023 curriculum to students of all programmes admitted in 2023 and onwards. Each semester is 15 weeks duration and of 20 credits. One credit is equal to 30 notional learning hours. So, in a semester students will complete 600 notional learning hours. In a week students will complete 40 notional learning hours. It includes approximately 5 self-learning hours per week.

The NCrF credit levels are shown below graphically

As shown in above graphics first year exit, second year exit are also included in the curriculum. National Credit framework is given below.

National Credit Framework (NCrF) -The Dimensions of Learning





Curriculum Framework

Semester wise Credit distribution and Mark distribution is given below.

Curriculum Frame work for All Programmes

Year	**Semester**	**Credits**	**Notional Learning hours**	**No. of courses**	Marks semester wise	Marks Year wise
First	**First**	20	600	6 to 8	800 to 900	1700
	Second	20	600	6 to 8	800 to 900	
Second	**Third**	20	600	6 to 8	800 to 900	1700
	Fourth	20	600	6 to 8	800 to 900	
Third	**Fifth**	20	600	10 to 12	800 to 900	1700
	Sixth (Internship)	20	600		800 to 900	(Diploma Award)
Total		120	3600	34 to 44	5100	5100

Award of Diploma

For the award of diploma in all programmes, all courses of 5th semester and 6th semester are taken into consideration.

Course Codes:

Entire curriculum of all Programmes is divided into five levels. These levels are given below. Level numbers are used for formation of course codes.

Level 1- Foundation Courses

Level 2- Life Skill and Professional Skills courses

Level 3- Basic Technology Courses

Level 4- Applied Technology Courses

Level 5- Management and Diversified Courses

Course Coding -

Course Code abbreviations	**Definitions**
CCH	Common Courses from H Scheme i. e. MPEC2023 curriculum
CEH	Courses from Civil Engineering
MEH	Courses from Mechanical Engineering
EEH	Courses from Electrical Engineering
ITH	Courses from Information Technology
ETH	Courses from Electronics & Telecommunication Engineering

Course codes are formed as:

First two letters are course code abbreviations. Next digit is level number and last two digits are serial number from that level.

For example: ETH307 (Microcontroller)

ETH- It belongs to Electronics & Telecommunication Engineering H scheme. (MPEC2023 curriculum)

3- Level 3

07- Sr. No of Level 3 courses from Electronics and Telecommunication Engg.

Course Baskets The MPEC2023 curriculum framework and its course basket system are designed to provide a flexible, multidisciplinary, and industry-relevant education. This approach empowers students to tailor their learning paths, develop a broad skill set and remain adaptable in a rapidly changing professional landscape. Courses are categorized into various structured Course Baskets under the National Credit Framework (NCrF) and NEP 2020-aligned curriculum. These course baskets are enlisted below –

Course Basket Name	**Description**
Discipline Specific Course (DSC)	It comprises of professional core courses, these focus on the foundational and advanced technical knowledge of discipline, along with the development of specialized skills.

Discipline Specific Elective (DSE)	Elective courses offered as two elective baskets in the 5th and 6th semesters, enabling students to explore advanced topics or emerging areas within their discipline.
Ability Enhancement Course (AEC)	These are the courses that are aimed at improving communication, language, and general competencies. For Example, courses like- *Entrepreneurship Development and Start-ups, Seminar and Project Initiation, etc.*
Skill Enhancement Course (SEC)	These courses are aimed at strengthening practical and communication skills, including *Professional Communication*, *Engineering Workshops, etc.*
Value Education Course (VEC)	These courses are designed to build ethical, social, and managerial competencies, including *Social and Life Skills*, *Essence of Indian Constitution, Environmental Education and Sustainability, Management, etc.*
Internship/Project (INP)	These are Industry-integrated courses for experiential learning which include -*Internship, Capstone Project.*