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An Efficient Curriculum Design for Engineering Programs Using Outcome Based Education (OBE) Approaches

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Abstract: Engineering, as a discipline, has a direct and vital impact on economic development, all aspects of people's life, and the provision of services to the society. The engineering curriculum design is based on sound educational principles for giving students necessary fitness to solve the real world problems. An Engineering curriculum is a continuously improving framework where the assessment of outcomes set path for further modifications to achieve the ideal result. Engineering and Technological Education have been analyzed by the impact of Engineering Pedagogy and Outcome Base Education (EPOBE). The speculation is that, using a mixed (EPOBE) methods approach, where, we investigate and analyze how Engineering Pedagogy (EP) and OBE can be attenuated novice learner in engineering and technological education. This research paper proposes such approach of curriculum design elaborating the design procedure with a case study of outcome-based education concepts, describes the development of outcome-based education, challenges of outcome-based education, discusses the pros & cons of the outcome-based educational approach and identifies different techniques to measure outcomes and finally, set up to improve and focus the global mobility in Engineering curriculum on outcome-based education approaches.

Keywords: Advance Pedagogy (AP), Engineering Pedagogy (EP), Activity Based Learning (ABL), Outcome Base Education (OBE), Programme Outcomes (POs), Course Outcomes (CO), Learning Outcomes (LOs), Engineering Pedagogy and Outcome Based Education (EPOBE), Outcome Based Deliverable Content (OBDC), Outcome Based Assessment (OBA).

1. Introduction:

Now a days engineers facing challenging expectations, including the ability to address complex societal problems, engineering education must ensure that the graduating student obtains the necessary skills and competencies to be a successful professional engineer. This education must include a strong foundation in mathematics and science, as well as training in the specific engineering disciplines. As design is a critically important skill of an engineer, students must deal with increasingly complex problems as they proceed through the educational process. The complexity of modern challenges, facing engineers also requires that the education include sound foundation in topics such as economics, communications, team skills, and the current global geo-political environment. Engineering Professionals are expected to be honest, impartial and fair in their day-to-day working [1].

Engineering Education is aimed at focusing teaching and learning environments that would bring about desired changes in learners, whether to be more knowledgeable, better skilled or to influence their attitudes and values positively [2]. Engineering Educational institutes can improve learner outcomes with innovative use of technology and impart knowledge, skills and values to survive in their life. As Engineering Education institutes flow move towards Outcome-Based Education (OBE) system which is learning analytics for better outcomes. Engineering Educational Institutes will be challenged to refurbish the way they define their Educational Standards, redesign their curriculum, mapping and assessment of learning outcomes at all levels, gather evidence of learning and analyze outcomes via variety of assessment tools and to accomplish continuous quality improvement process [3]. By taking a look at the traditional undergraduate education system present as on today, it is found that the system is not effective as students are not industry ready and lack in professional skills, soft skills, personality and leadership skills. Keeping the performance of the students in focus, colleges and universities around the world are moving towards adopting OBE [4].

2. Development of Outcome-Based Education

OBE has been adopted for more than a century when educationalists brought to light the
importance of appreciating students' individual variation in the learning process, believing that education is best measured by encouraging individual students' achievement that could occur at different rates for different students [5, 6]. The objective of OBE is to ensure that learners are highly equipped with knowledge, skills and attitudes required to become a successful person after they exit the educational system. OBE is an educational process that focuses on future performance skills of the learners and to apply knowledge for achieving their outcomes after they are taught.

One of the major issues in OBE is the effective curriculum design that provides experiential learning. Effectiveness of any curriculum can be measured by the process of teaching- learning and assessment of what students can actually do (i.e., learning outcomes), after they are taught. The OBE mainly attempts to adopt learning outcomes of the students in terms of knowledge, skills, attitudes and values that match the immediate social, economic and cultural environment of society. According literature survey made, there are three broad types of OBE [4]:

2.1 Traditional OBE which measures the learning outcomes in terms of students' mastery of the established curriculum.

2.2 Transitional OBE which measures the learning outcomes of students in terms of generic or higher order competencies such as critical thinking, problem solving, communication skills and teamwork.

2.3 Transformational OBE which measures the learning outcomes of students in terms of broad category of disciplinary knowledge and skills (i.e., multi-disciplined), generic competencies, attitudes and values required by the industry or society. Here is a table showing the differences between the Traditional Content Based System to Outcomes Based System [4].

Content Based Learning (Traditional/Transactional)	Outcome Based Learning (Transformational)
Learners are passive.	Learners are active.
The approach is exam-driven.	Learners are assessed on an

	ongoing basis.
Rote-learning is encouraged.	Critical thinking, reasoning, reflection and action are encouraged
The syllabus is content-based and divided into subjects.	Content is integrated and learning is relevant and connected to real-life situations.
Learning is textbook/worksheet-bound and teacher-centred.	Learning is learner-centred, the teacher facilitates and constantly applies group work and team work to consolidate the new approaches.
The teacher sees the syllabus as rigid and non negotiable	Learning programmes are seen as guides that allow teachers to be innovative and creative in designing their programmes.
Teachers are responsible for learning and motivation depends on the personality of the teacher.	Learners take responsibility for their own learning and are motivated by feedback and affirmation of their worth

Table 1: Comparison between Content Based Learning and Outcome Based Learning.

The move from mainly content-based education to OBE was thought of at a time when the quality movement in business and manufacturing was introduced. Education reflects the notion that, in order for people to get where they want to be, the achievement has to be pre-determined. Once the objective has been determined, strategies and other ways and means should be put into place to achieve this goal. With OBE, the learner will accomplish more than the mere retention of knowledge or the mastering of skills.

Fig 1. Overview of Outcome Based Education

It is the intention of the outcomes-based approach to focus as much on the process of learning and the final outcome or result, as on the knowledge and skills. In this way, the process of achieving outcomes during the process of learning can be related directly to the way in which outcomes are achieved in the world of work. The outcomes-based approach requires a mind shift in the curriculum process and the way in which the learner should be empowered for the achievement of outcomes.

The difference between OBE and traditional content based education is that the latter is mostly content- or skill-driven and teacher-centred. The primary purpose of content-based education is to master knowledge with textbooks and teachers being the sources of information.

OBE on the other hand, is based on identifying and listing the generic competencies for a particular job or a

range of job activities at a particular level. Manuals or guides are used as directives to provide guidelines for self-paced learning. Furthermore, OBE is a learner-driven learning process and aimed at achieving outcomes. Particular learning procedures are used to guide learners in order for them to achieve their outcomes in real-life situations. Knowledge and skills can be extracted from any source and the role of teachers evolves accordingly to provide guidance for learners [7]. The challenges of OBE principle are that the different academicians interpret it in different ways. The inner realization of OBE principle is to, expand consciousness of one's spiritual nature as well as potential (essence of OBE), develop one's intuitive connection to universal wisdom (nature of learning); take full responsibility for one's life and experiences (major outcome measure), explore meditative exploration by quieting the conscious mind (key pedagogy), explore learner-controlled timing as well as group-enhanced experience (temporal structure) [8].

Learning System Characteristics	**Content Based Learning (Traditional / Transactional)**	**Outcome Based Learning (Transformational)**
Frame work	Predefined curriculum, assessment & credentialing in place. Structures ends, no defined learners outcomes.	Curriculum, instructional strategies, assessment & performed standards. Structures support outcomes, flexible & a means to define "learning ends".
Time	Inflexible constraint for educator & learner schedule controls learning & success.	Used alterable source match needs of educator & learners.
Performance standards	Comparative & competitive approach. Linked to predetermined "curve" or quota of possible successes.	Learners potentially able receive credit for achieving Performance standards. No quotas & standards pursued
Learning assessments	Continuous testing & permanent grading. Mistakes on permanent record: best grades & records fast & consistent performers; slower learners never catch up Never assess/ document what learners can ultimately do Successfully.	Macro view learning & achievement. Mistakes inevitable steps in development, internalizing & Demonstrating high level of performance capabilities. Ultimate achievement what able to do.

Table 2: Comparison outcomes between Content Based Learning and Outcome Based Learning.

This demand for engineering courses has resulted to increased creation of engineering institutions but due to the low quality of education they deliver, there has been the problem of unemployment of an extensive number of the fresh graduates. In general the industry expects the following skill sets from the engineers:

Attitude (Sincerity, Can-Do, Ownership / Motivation).

Business Ethics/Honesty.

Grooming/Confidence.

Communication Skills.

General Awareness.

Basic Managerial Skills (Leadership, Teamwork, Time Management, etc.).

Basic Sales and Customer Service (most entry level jobs require one of these).

Domain Knowledge.

From the above skill sets, the soft skills are top most essential component. To achieve the above skill sets from the engineers, the industries expectation to teach and train the students at Institutional end as per requirement of the industries. That is why the Outcome Base Education (OBE) is most important instead of Traditional Education (TE).

OBE has been adopted for more than a century when educationalists brought to light the importance of appreciating students' individual variation in the learning process, believing that education is best measured by encouraging individual students' achievement that could occur at different rates for different students [5, 6, 7].

The objective of OBE is to ensure that learners are highly equipped with knowledge, skills and attitudes required to become a successful person after they exit the educational system. OBE is an educational process that focuses on future performance skills of the learners and to apply knowledge for achieving their outcomes after they are taught.

The process of establishing the PEOs are as shown in Figure 2. Vision is a revolutionary
statement that the Institution would like to achieve over a long period of time. Mission statements are essentially the means to achieve the vision [7]. The mission should clearly state the purpose of the program. It should indicate the primary functions or activities of the program. It should support the Institute and the Institute missions.

A learning outcome is a statement of what a learner is expected to know, understand or be able to do as a result of a learning process. It defines the type and depth of learning students are expected to achieve and guide the instructor to adopt appropriate teaching methodology and mainly three types of learning outcomes:

Programme Educational Objectives (PEOs)
Programme Outcomes (POs)
Course Outcomes (COs)

The Programme Educational Objectives are the statements that describe the expected achievements of graduates in their career and also in particular, what the graduates are expected to perform and achieve during the first few years after graduation [8,9].

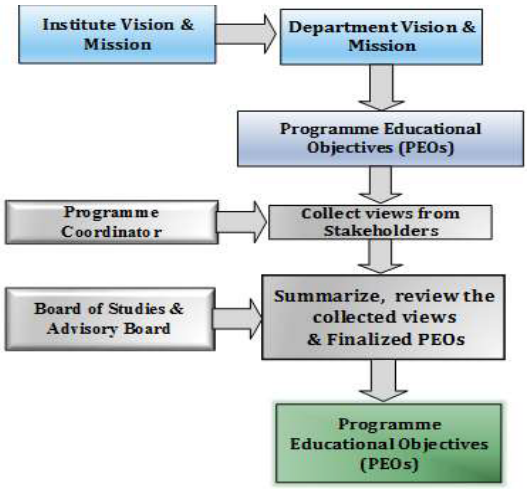

Fig. 2 The process of establishing the PEOs

The process of defining the POs is as shown in Figure 3. Program outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. Program outcomes basically describe knowledge, skills and behavior of students as they progress through the program as well as by the time of graduation. Program outcomes must align with the Graduate Attributes (GAs). Graduate attributes are the qualities, skills and understandings a university community agrees its students should develop during their time with the institution. COs are the statements of what a student should be able to demonstrate upon completion of a course. It must be student-focused and Alignment with PLO, PEO and Mission. [10] It represents the minimum performances that much be achieved to successfully complete a course.

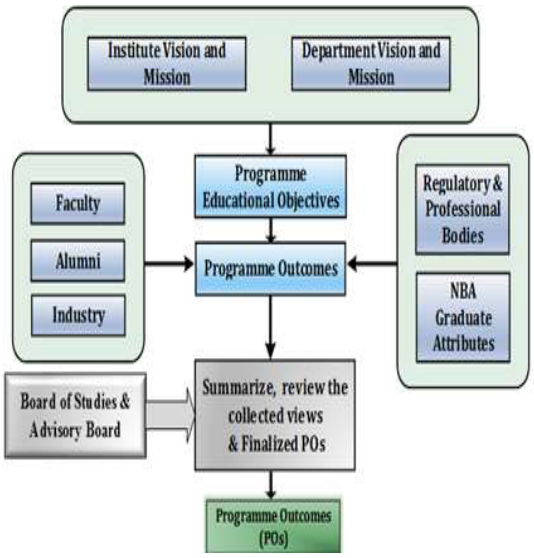

Fig. 3 The Processes of defining the POs

3. Framework of Engineering Education

The Engineering framework used as a tool for evaluating the degree to maintain academic standards, curricula, and teaching practices by maintaining 12 Graduate Attributes (GA).

The 12 Graduate Attributes (GA):

1. (KB) A knowledge base for engineering: Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.

2. (PA) Problem analysis: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions.

3. (Inv.) Investigation: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data and synthesis of information in order to reach valid conclusions.

4. (Des.) Design: An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.

5. (Tools) Use of engineering tools: An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.

6. (Team) Individual and teamwork: An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.

7. (Comm.) Communication skills: An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.

8. (Prof.) Professionalism: An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.

9. (Impacts) Impact of engineering on society and the environment: An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.

10. (Ethics) Ethics and equity: An ability to apply professional ethics, accountability, and equity.

11. (Econ.) Economics and project management: An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations.

12. (LL) Life-long learning: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge.

The framework has 12 key indicators that, when taken together, summarize a quality engineering education for all students throughout their K-12 education. The academicians get road map for making curriculum from GA, academic studies and industrial experiences [11].

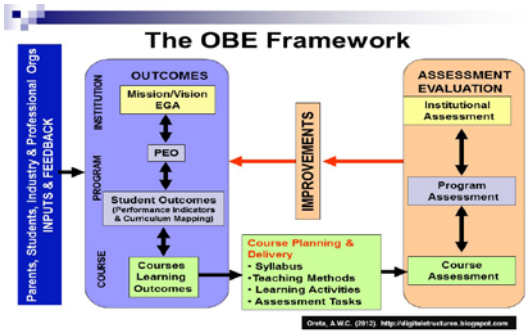

Fig. 4: The OBE Framework

4. Pedagogical Approaches in Engineering Education

Innovation is about doing useful things differently: converting novel ideas and methods into solutions that meet new needs, or adding significant value to

established products and services. In engineering education, new technological and practice requirements necessitate curriculum innovation, while innovation in educational practice can improve students' learning and faculty productivity. So, this goal can be achieved by the pedagogical approach and also by introducing advance-pedagogy in engineering. The key component of advance-pedagogy is micro-teaching, where each topic is analyzed and delivered with the mapping of real world philosophy. The content level analysis and mapping it with real world philosophy is the key idea of learning out come as depicted in fig.5.

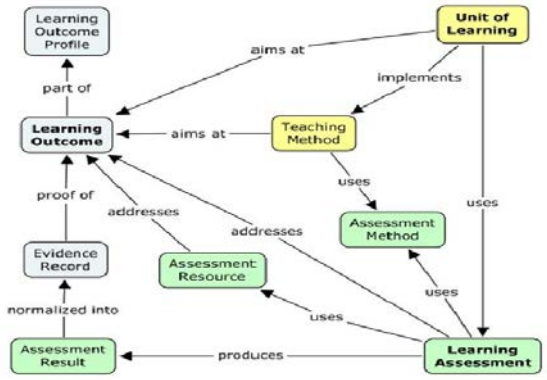

Fig.5: A concept mapping of OBE assessment

Subject matter knowledge as shown in fig-6 is one form of content knowledge and includes knowledge of the facts and subject content, including the major concepts of the field, the relationships among concepts and a full understanding of the structures of the subject [9]. In science and engineering education, this includes theoretical facts of phenomena and propositions and their justifications. The mastering of the applications to everyday life and engineering is, of course, of crucial importance. The subject matter knowledge of an engineering educator should be built of, not only of academic studies, but also of a wide experience of working in the industry or as a researcher where the knowledge has been applied, proven and refined in practice.

The Outcome Based Deliverable Content (OBDC) is sent to the student (class wise) in advance so that student can acquire knowledge prior to the class initiation which ensures deep learning (FLIP Learning) by asking many questions to the teacher as well as fellow friends.

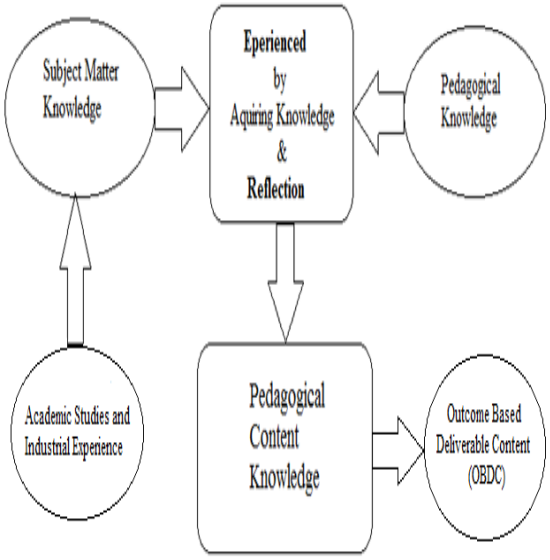

Fig.6. Structure of Engineering Pedagogy and OBE (EPOBE)

The above fig.6 depicts how Outcome Based Deliverable Content (OBDC) can be developed from subject matter knowledge and pedagogical knowledge; whereas subject matter knowledge can be enhanced from academic studies and industrial experience.

The impact of OBDC is to enhance skill because in industry skill is more important than knowledge. In our EPOBE, the entire GA reflects in PEO and BLOOM's revised taxonomy is used to design PEO as shown in Fig.7.

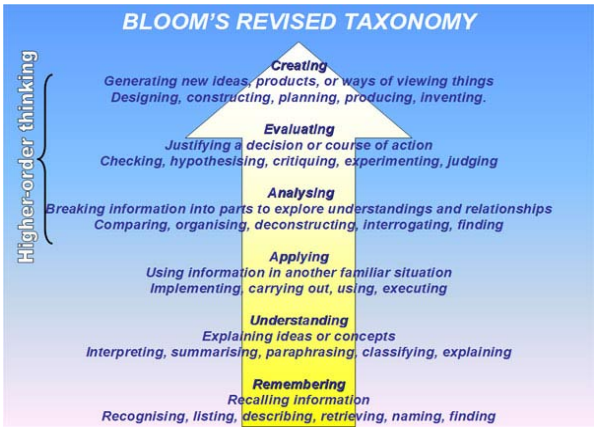

Fig.7: Bloom's Taxonomy

BLOOM's taxonomy can be used to identify different kind of pedagogical knowledge in the contents as well as to design OBDC.

Whereas pedagogy include "the art, science or profession of teaching" and "the study of the methods and activities of teaching". Pedagogy may be thought of as a subset of education; pedagogy focuses on teaching – who and what is taught and how it is taught – whilst education is a broader term encompassing the institutions in which teaching takes place, policies governing how institutions operate [12].

When we start writing learning objectives, we will discover that different tasks call for different knowledge and skill levels, with a few tasks requiring only memorization to complete ,whereas a majority of them calling for analytical skills and creativity.

A system of classifying learning objectives according to their required skill levels was formulated by Benjamin Bloom, called Bloom's Taxonomy of Educational Objectives.

The categories were formulated as below.

cognitive (thinking and problem-solving skills) ,

affective (attitudes, value systems) &

psychomotor domains

The categories or levels for the cognitive domain (which is critical for engineering graduates) and illustrative action words for each level are as follows:

1. **Knowledge** (repeating verbatim): list, state.

2. **Comprehension** (demonstrating understanding of terms and concepts): explain, interpret.

3. **Application** (applying learned information to solve a problem): calculate, solve.

4. **Analysis** (breaking things down into their elements, formulating theoretical explanations or mathematical or logical models for observed phenomena): derive; explain.

5. **Synthesis** (creating something, combining elements in novel ways)**:** formulate, make up, design.

6. **Evaluation** (making and justifying value judgments or selections from among alternatives): determine, select, critique.

Levels 4 to 6 are known as the Higher Order Thinking Skills (HOTS), which are expected by industry from Engineering Graduates.

4.1 Assessment and Evaluation

It is necessary to judge whether and how well the students learnt a body of knowledge or mastered a skill, or how well a teacher taught a course, or how well a product or process has met its design specifications, or how well an instructional program has met its educational objectives.

A two-step process is used to make the judgment rationally:

4.1.1 Assessment

Decide on the data/observations (that is to be used as a basis for making the judgment) and the procedures (observations, measurements, experiments, surveys), that will be used to collect the data and perform the analysis needed to present the data into a form, suitable for the next step.

4.1.2 Evaluation

Using the assessment outcomes and pre-established criteria, draw conclusions and make evaluative judgments. Fig 8 presents the Concept Map on Constructive Alignment of intended outcomes, delivery and assessment.

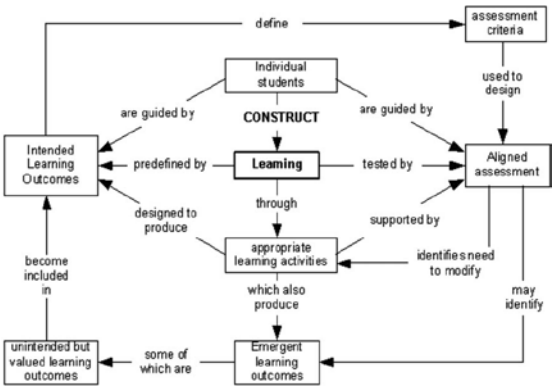

Fig. 8: Concept Map on Constructive Alignment of intended outcomes, delivery and assessment.

Learning outcomes, especially when mapped to specific educational experiences, can also be used by the students to do self-assessment of their own progress. At the same time, learning outcomes may best be used as a tool for academic and professional mobility but not as a tool to standardise curricular content at the national/international level.

5. Techniques of Outcome Based Education Assessment Methodology

Assessment is one or more processes that identify, collect, and prepare data to evaluate the achievement of Program Outcomes and program educational objectives. These are processes for interpreting the data and evidence accumulated through assessment practices. Evaluation determines the extent to which POs or PEOs are being achieved, and results in decisions and actions to improve the program as also for accreditation [7].

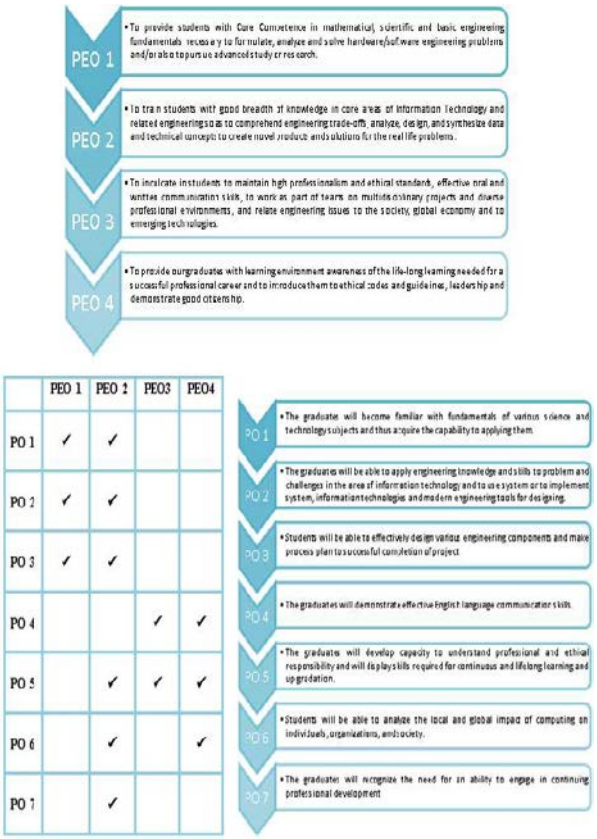

Fig. 9 Mapping of PEOs & POs

Program Education Objectives can be assessed few years after graduation - 4 to 5 years. Program Outcomes can be assessed upon graduation. Course Outcomes can be assessed upon course completion.

OBE assessment can be achieved using ***direct methods*** and ***indirect methods***.

Direct methods using measurable performance indicators of students are like end semester examination, class tests, lab

exam, class presentations, assignments / tutorials, project / group activities, case study etc. Indirect methods ascertaining opinions or self-reports are like rubrics, surveys (Employer, Alumni, Faculty, etc.), interview by industry experts, feedback by the stakeholders, competitive exams etc.

A rubric is an authentic assessment tool used to measure student work. A rubric is a scoring guide. It distinguishes teaching and learning by clearly stating criteria and describing levels of quality. The purpose of the rubric is not only to evaluate but also to help students increase their level of performance by outlining a vision of success.

6. Structuring the Engineering Curriculum Design

Once POs have been clearly defined, a system level design has been developed in which course stream formation; content delivery and evaluation are considered to be main aspects.

The POs are achieved through curriculum which offers a number of courses as well as elective courses. The courses offered could be broadly classified as Basic Sciences, Engineering Sciences, Core Engineering, Humanity and Social sciences, Electives and Project work.

The present case study considered involves the curriculum design in Instrumentation Technology. This curriculum has 30% weightage on basic and Engineering Sciences, 40% weightage for core engineering courses while 20% for electives and 10% weight for Humanities, Social sciences and project work. The designed curriculum is grouped mainly into six streams.

6.1 The Curriculum Implementation

Every course structured in the curriculum will have course outcomes (COs) which are priory defined. Table 3 indicate the COs of the course defined in the streams. The COs are the outcomes that a student is expected to achieve after learning the course.

CO1: Apply knowledge of digital Electronics, identify various functional blocks of, microprocessor and its interconnection to peripherals in forming a microcomputer based system (PO1, PO2)
CO2: Using standard programming structures, develop assembly language programs to solve reasonably complex problems and implement the same on a standard assembler (PO3,PO4,PO6)
CO3: Design memory interface for different system requirements using typical memory chips (PO3.PO4,PO5)
CO4: Using Input / Output data transfer techniques and interfacing chips, design hardware and software for different applications (PO3,PO4,PO5)

Table. 3: COs of Microprocessors

For example, this paper takes up the case studies of Microprocessors. Under the transformational or rigorous OBE, curriculum, teaching and assessment are developed jointly by all stakeholders - students, employers, faculty staff, alumni and community. Each student's needs and learning outcome are accommodated in this approach through multiple instructional strategies and assessment tools including assignments, projects, oral presentation, traditional tests and the totality or portfolio of the student's work.

Common teaching and learning methods include interactive lecture, case based learning, problem-based learning, simulation, role play; online tutorials, self-directed learning, experiential learning, laboratory work, fieldwork, peer tutoring; together with a choice or combination of different assessment methods such as objective tests, case studies, essay questions, projects, end-of chapter type problems, reflective journals, seminar presentation, portfolio, examinations, and peer and self-assessment.

Students will undergo rigorous training on selected set of courses and will be taking up continuous internal evaluation (CIE) tests given by the course instructor and semester end examination (SEE) conducted at institution level comprising of both internal and external evaluators. The following section indicates the attainment of POs through COs.

6.2 Attainment of POs

One of the parameters to measure the attainment of POs is through evaluation of attainment of a predefined set of COs. Each course has defined set of COs that are mapped to the POs and they are used to provide quantitative measurement of how well course outcomes are achieved. The CO mapping is done quantitatively and mapping matrix is made available in the course syllabi. Meeting the COs by the process of evaluation through examination system is a clear benchmark for attainment of POs. Indirect measurement involves the course-end survey, project based learning assessments, conducting open ended experiments, taking up competitive examination for higher education etc.

6.3 Attainment of COs

COs are evaluated based on Continuous Internal Evaluation (CIE) as a direct measure and Course End Survey (CES) as an indirect measure. To explain the procedure adopted for attainment calculation, two courses examples have been considered.

The total attainment in terms of the students' performance towards achieving the COs is measured using both direct and indirect assessment tools. The direct assessment involves his performance measures in CIE and SEE.

6.4 CIE Calculation

6.4.1 Rubric for Direct Assessment

The Table 4 shows the attainment of COs in another course-work Microcontrollers taken up by the students in the 2nd year of their course. As seen in Table 4, the rubric developed for direct attainment considers test performance of the students where scoring of 60% of the marks in every question set in the question paper is given a weightage of 50%. Above 75% of the scoring is given weightage of 25%. Below 60% and above 40% is given weightage of another 25%. From the table it is seen that this course contributes with four outcomes to POs where 4 POs have been addressed by these COs. The results represented clearly indicate that the CO computation of different courses and intern their impact on PO attainment using direct method.

ATTAINMENT	CO1	CO2	CO3	CO4
>40%	0.847	0.90	0.85	1
>60%	0.76	0.81	0.70	0.98
>75%	0.63	0.76	0.62	0.87

Table 4: CIE Contribution for COs attainment (Direct) for Microprocessor course.

6.4.2 Rubric for Indirect Assessment

Rubrics are the tools used for assessing the course outcomes indirectly which would have an impact on PO attainment. Course end survey for every course designed under the curriculum structure and the analysis of the survey carried out in the form of a rubric gives the outcome of a course in terms of percentage achievements. Following few questions belong to course end survey questionnaires. The question sample indicated in this paper also indicate the POs addressed and quantitative measurements can be computed using the response.

1) Q: Will you be able to design, build, and debug simple microcontroller based systems by applying suitable algorithms? [PO1, PO2, PO3]

No. of responses: 40

Yes	35
No	3
Other	2

2) Q: Given an analog circuit using diodes, BJTs and FETs, would you be able to identify and describe models and transfer characteristics of the same? [PO1, PO2]

No. of responses: 40

Yes 37	92%
No 2	5%
Other 1	3%

3) Q: How would you rate the relevance of the subject?

No. of responses: 40

1	1	2%
2	0	0%
3	8	20%
4	19	48%
5	12	30%

Conclusion

The EPOBE structure is associated with soft-skill, engineering education framework based on Graduate Attributes, OBE framework and advance engineering pedagogy. The educations are supplied according to the macro-level curriculum which is designed based on OBE, but faculties use to deliver the content at micro-level. Advance Pedagogy is the platform to develop micro-level teaching teachers, parents and students away from grades so that Learning Outcomes are accorded due weight age in the assessment systems. Successful implementation of Outcomes based engineering Education is possible only with the concerted efforts of all the stake holders - students, teachers, employers and the government - as every one of them stands to gain out of it. The traditional learning methodologies have failed to get the most out of what learners could do after undergoing the learning process. An essential part of the OBE approach involves formation of measurable outcomes. Developing an Outcome Based Education system in engineering higher education is the best way for learner to achieve their goals after graduation. In this way it seen that the outcome based education provides an opportunity for a student to explore theirs interests in technical education. The OBE implementation enables them to be able to evolve to take up the engineering problems addressing the contemporary issues and provide Engineering solution.

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