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Eshan College of Engineering



(Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh)

Implementation of Outcome Based Education (OBE)

(Implemented w.e.f Academic Year: 2019-20)

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1. Introduction

This manual is a reference to help faculty, staff and stakeholders to understand the Outcome Based Education (OBE) system implemented at Eshan College of Engineering. The manual serves as valuable guidelines for the faculty to meet the affiliating University prescribed assessment plan in the process to measure the outcome of the students during their time of study and also after their programme.

1.1. Outcome Based Education (OBE)

Outcome based education (OBE) is student-centered instruction model targeting on measuring student performance through outcomes at the end of a program. Outcomes include knowledge, skills, attitudes and behaviour. Its focus remains on evaluation of outcomes of the program by stating the knowledge, skill and behaviour a graduate is expected to attain upon completion of a program and after 4 – 5years of graduation. In the OBE model, the required knowledge and skill sets for a particular engineering degree is predetermined and the students are evaluated for all the required parameters (Outcomes) during the course of the program. The induction of India in the Washington Accord in 2014 with the permanent signatory status of the National Board of Accreditation is considered a big leap forward for the higher-education system in India. It means that an Engineering graduate from India can be employed in any one of the other countries who have signed the accord. For Indian Engineering Institutions to get accredited as per the pacts of the accord, it is compulsory that engineering institutions follow the Outcome Based Education system.

The Washington Accord is an international and multi-lateral agreement among bodies responsible for accrediting undergraduate engineering degree programs, originally signed among six countries in 1989. It recognizes the substantial equivalency of programs accredited by bodies that are its signatory and recommends that graduates of programs accredited by any of the signatory bodies be recognized mutually as having met the academic requirements for entry to the practice of engineering in the area of their jurisdiction. National Board of Accreditation became a provisional member of the Washington Accord (WA) in 2007 and was given the status of permanent signatory on 13th June, 2014.

Teaching with this awareness and making the associated effort constitutes outcome-based education. This entails a regular methodology for ascertaining the attainment of outcomes, and benchmarking these against the program outcomes consistent with the objectives of the program.

2. Vision, Mission & Quality Policy of Eshan College of Engineering

Vision

To create conducive environment in which students acquire professional and ethical qualities to become socially responsible technocrats.

Mission

- To impart high quality education and professional skill development to our students
- To inculcate discipline, team-spirit and critical thinking ability in students



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- To promote the advancement in research and education by providing the supportive environment
- To provide education that is liberal, inculcate professional behaviour with strong ethical values

Quality Policy

Committed to attain the status of preferred destination among students through continues improvement in delivery of quality education.

2.1. Vision & Mission of all Departments of the College

Vision & Mission: Department of Computer Science & Engineering:

Vision

To produce highly competent and innovative computer science professionals through excellence in teaching and training with latest tools & technologies.

Mission

- a. To impart high quality education and professional training to our students by providing conducive environment and state of the art infrastructure.
- b. To inculcate leadership skills in students and encourage them to become globally competent professionals.
- c. To render value-based education to students to take better engineering decision with social consciousness and to meet out the global standards.

Vision & Mission: Department of Civil Engineering:

Vision

To produce highly competent and skilled civil engineers, through quality engineering education with global perspectives, for the sustainable growth of the society.

Mission

- a. To provide state of the art infrastructure and conducive environment with innovative teaching and learning in the department.
- b. To provide sustainable solutions to civil engineering problems through industry-institute interaction by dissemination of knowledge and technical services.
- c. To impart soft skills, leadership qualities, professional ethics and human values among civil engineers for successful professional carrier.

Vision & Mission: Department of Electrical Engineering:

Vision



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To produce globally competent and socially sensitized electrical engineers with strong commitment towards societal development.

Mission

- a. To prepare engineering graduates with sound fundamental knowledge of Electrical Engineering by providing quality education through excellence in teaching-learning blended with practical engineering skills.
- b. To provide conductive, academic, and social environment to groom our graduates as socially acceptable citizens.
- c. To provide state of art infrastructure and technologies for students to meet the global emerging challenges through collaborations with academia and research organizations and industry-institute relationship.

Vision & Mission: Department of Mechanical Engineering:

Vision

To be recognized as an excellent centre providing mechanical engineering education, leading to highly competent engineers having professional, ethical and social concerns.

Mission

- a. To impart quality education for thorough knowledge of the domain to our students for enhancing their fundamental skills to make them globally competitive mechanical engineers.
- b. To provide state of the art facilities and conducive environment for well grounding our students in the fundamental principles of engineering and preparing them for diverse careers.
- c. To strengthen continuing education with special focus on training and skills up gradation of students through institute-industry relationship & collaborations with academia and research organizations.

Vision & Mission: Department of Applied Sciences & Humanities:

Vision

A department recognized for providing quality education and all-round development to students to facilitate various programmes running in college to attain their programme outcomes through effective linkage with first-year development.

Mission

To pursue excellence in imparting quality education in basic engineering, basic sciences and humanities with special focus on development of communication skills, social responsibility and ethical values in students.

Note: - After formation of Vision & Mission of the College, approval will be taken from Chairman Governing Council forwarded by Director's Office. At department level approval will be taken from office of Director.

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3. Education Objectives of Eshan College of Engineering

- I. To provide high standard of technical & professional knowledge to students through quality education.
- II. To provide a high quality engineering education in various disciplines of engineering through effective teaching learning sessions & co-curricular activities.
- III. To ensure that students attained excellent technical & professional skills obtained through acquired knowledge/education/learning provided by the College.
- IV. To develop life-long learning skills that allow them to be adaptive & responsive to ups and downs in society, technology, and the environment, as well as career demands.

On the basis of above mentioned education objectives, all departments will form their PEO'S.

4. Program Education Objectives (PEOs)

All programmes offered in Eshan College of Engineering have a defined set of PEO's. Academic committees of individual departments finalised the PEO's of all programs and got approval from Dean Academic Affairs (DAA) and Director of the College.

- The PEOs are consistent with the mission of the College.
- Feedbacks are collected involving all stakeholders to frame the PEOs of individual programs.
- PEOs are based on the needs of the stakeholders.
- PEOs of all programs are aligned with the mission of the department/Institution.
- PEO's should be achievable by the programme.
- PEO's should not be too narrow and similar to the PO's.
- The programme shall demonstrate how the PEOs are aligned with the mission of the department /institution.
- The department PEOs will be formed by Department & final draft will be forwarded to Director's office for final approval.

4.1. Program Education Objectives (PEOs) & Programme Specific Outcomes (PSOs) of all programmes (Department-Wise) of the College

Department of Civil Engineering

Program Educational Objectives (PEOs) of B.Tech. Civil Engineering Programme

1. To train students to undertake, design and analyze civil engineering projects with social awareness and responsibilities.



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- 2. To train students in such as a way that they can pursue higher studies for research and development of civil engineering and other allied domains.
- 3. To train students to function effectively and ethically in the multicultural and multidisciplinary teams for the sustainable development and growth of civil engineering projects and profession.

Program Specific Outcomes (PSOs)

At the completion of B.Tech. Civil Engineering programme, our:

- **PSO 1:** Graduates shall demonstrate sound knowledge in design, analysis, laboratory investigations and construction aspects of civil engineering projects, along with good foundation in mathematics, basic sciences and technical communication.
- **PSO 2:** Graduates will have a broad understanding of economical, environmental, societal, health and safety issues concerning civil engineering projects, and shall demonstrate ability to function within multidisciplinary teams with competence in modern tool usage.
- **PSO 3:** Graduates will be motivated for continuous self-learning in engineering practice and/or pursue research in advanced areas of civil engineering in order to offer engineering services to the society, ethically and responsibly.

Department of Computer Science & Engineering (CSE)

Program Educational Objectives (PEOs) of B.Tech. Computer Science & Engineering programme

- 1. To groom the graduates of the programme for logical and practical approach to problem solving and function effectively as skilled computer professional sensitive enough to continuously changing customers needs with a well-balanced preparation in engineering fundamentals and practical application.
- 2. To enable the graduates of the programme to work in multicultural and multidisciplinary teams for effective problem solving and understand the need of cost effectiveness and sustainability.
- 3. To enable the graduates of the programme in applying basic principles and practices of computing grounded in mathematics and science for successfully completing projects & engage in research.

Program Specific Outcomes (PSOs)

At the completion of B.Tech. Computer Science & Engineering programme, our:

- **PSO 1:** Graduate will be able to apply theoretical and practical knowledge of computer science to develop solutions to the real time problems.
- **PSO 2:** Graduate will be able to apply and demonstrate the acquired knowledge of computer science and engineering in response to emerging trends and contemporary technologies of the field.



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Department of Electrical Engineering

Program Educational Objectives (PEOs) of B.Tech. Electrical Engineering programme

- 1. To train students to apply the acquired knowledge of electrical engineering in its core and allied fields to assimilate, simulate, design, analyze and create solutions and services considering safety, sustainability and cost effectiveness.
- 2. To encourage the graduates for higher studies to meet the diversified needs of electrical industry, academia and research.
- 3. To train students of the program in a manner that they should function effectively and ethically in multicultural and multidisciplinary groups practicing electrical engineering profession.

Program Specific Outcomes (PSOs)

At the completion of B.Tech. Electrical Engineering programme, our:

- **PSO 1:** Graduates will demonstrate their knowledge in effective implementation electrical engineering fundamentals during practicing their profession with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- **PSO 2:** Graduates will be able to design, analyze, evaluate and improve electrical systems for the betterment of industrial operations and hence the society.
- **PSO 3:** Graduates will be motivated for continuous self-learning in engineering practice and pursue research in advanced areas of electrical engineering and allied domains to offer engineering services to the society, ethically.

Department of Mechanical Engineering

Program Educational Objectives (PEOs) of B.Tech. Mechanical Engineering programme

- 1. To prepare students to apply the acquired knowledge of mechanical engineering in its core and allied fields to take industrial problems to create solutions and services considering safety, sustainability and cost effectiveness.
- 2. To prepare students of the program to be able to function effectively, professionally and ethically in multicultural and multidisciplinary groups practicing engineering by profession.
- 3. To motivate students to undertake higher studies to meet the diversified requirements of mechanical industry, academia and research.

Program Specific Outcomes (PSOs)

At the completion of B.Tech. Mechanical Engineering programme, our:

PSO 1: Graduates will be able to apply the acquired theoretical and practical skills to solve the industrial problems of mechanical as well as multidisciplinary nature considering safety, sustainability and cost effectiveness factors.



PSO 2: Graduates will be motivated enough for continuous self-learning in engineering profession and pursue research in advanced areas of mechanical & allied engineering to offer engineering services to the society, ethically.

4.2. Mapping of PEOs with Mission (Target Level Mission)

| PEO / Mission | M1 | M2 | M3 | M4 |
|-----------------------------|-----|-----|-----|-----|
| PEO1 | 3 | 3 | 3 | 2 |
| PEO2 | 2 | 2 | 3 | 2 |
| PEO3 | 2 | 3 | 2 | 3 |
| Target Level Mission | 2.3 | 2.7 | 2.7 | 2.3 |

Target level of Mission Identified.

4.3. Mapping of POs/PSOs with PEOs (Target Level PEOs)

| РО | P | EOs (Mappin | g) |
|-------------------|------|-------------|------|
| | PEO1 | PEO2 | PEO3 |
| PO 1 | 3 | 2 | 2 |
| PO 2 | 3 | 3 | 2 |
| PO 3 | 3 | 3 | 2 |
| PO 4 | 3 | 3 | 2 |
| PO 5 | 3 | 3 | 3 |
| PO 6 | 3 | 1 | 3 |
| PO 7 | 3 | 1 | 3 |
| PO 8 | 3 | 1 | 3 |
| PO 9 | 1 | 2 | 3 |
| PO 10 | 1 | 2 | 3 |
| PO 11 | 2 | 2 | 3 |
| PO 12 | 1 | 3 | 2 |
| PSO 1 | 3 | 2 | 2 |
| PSO 2 | 3 | 2 | 3 |
| Target Level PEOs | 2.50 | 2.14 | 2.57 |

Target level of PEOs identified.

5. NBA's Graduate Attributes (GAs) of all (B.Tech.) programmes of the college:

• Engineering knowledge

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- Problem analysis
- Design/development of solutions
- Conduct investigations of complex problems
- Modern tool usage
- The engineer and society
- Environment and sustainability
- Ethics
- Individual and team work
- Communication
- Project management and finance
- Life-long learning

6. Programme Outcomes (POs) of UG (B.Tech.) programmes of the college:

The outcomes of the program are statements that describe skills that we expect to enable our students to attain by the time of graduation:

- **PO 1:** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO 2:** Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO 3:** Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO 4:** Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO 5:** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- **PO 6:** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO 7:** Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO 8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.



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- **PO 9:** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO 10:** Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO 11:** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO 12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

The POs formulated for each programme by the College must be consistent with the NBA's Graduate Attributes.

7. Course Outcomes (COs)

Course Outcomes (COs) will be formed for each course of all the programs.

- The faculty members teaching a particular course will either consider the affiliating University prescribed COs of their courses or formulate the COs & get approved by department Academic committee in consultation with HoD.
- Five COs can be formulated for each course. The COs are formed by considering the learning levels of Bloom's Taxonomy. COs are the overall learning's at the end of concerned course.
- COs are to be mapped with POs in matrix form.
- Correlation levels 1, 2, 3 as defined (1: low, 2: Moderate, 3: High). COs will be mapped with POs on the basis of these correlation levels.
- If there is no correlation, put "-" or left blank or put zero.
- Attainment of PO's will be calculated on the basis of mapping done between COs & POs.
- Two main components will be considered for calculation of attainment of POs. These are Direct Methods (Class test, Assignment/Tutorials, Seminar, Project, Lab attainment and affiliating University examination) & Indirect Methods (Surveys, Curriculum Feedbacks, Input from outside sources, Co-curricular & extra-curricular activities, etc.)
- Course wise CO attainment will be calculated by considering:
 - 70% contribution of external exam &
 - 30 % contribution of internal exams
- The overall attainment of outcomes of a program (POs) will be computed by adding:
 - Direct attainment methods (in the proportion of 80 %)
 - Indirect attainment (in the proportion of 20 %).



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8. Bloom's Taxonomy



Bloom's Taxonomy

| Level | Descriptor | Level of attainment |
|-------|---------------|---|
| 1. | Remembering | Recalling from memory of previously earned material |
| 2. | Understanding | Explaining ideas or concepts |
| 3. | Applying | Using information in another familiar situation |
| 4. | Analysing | Breaking information into part to explore understandings and relationships |
| 5. | Evaluating | Justifying a decision or course of action |
| 6. | Creating | Generating new ideas, products or new ways of viewing things |

Bloom's Taxonomy is hierarchical, meaning that learning at the higher level requires the skills which are attained at lower level.

Action Verbs for Assessment in constructing assessment questions are important to consider. Quite often, the action verbs are indicators of the complexity (level) of the question. Over the time, educators have come up with taxonomy of measurable verbs corresponding to each of the Bloom's cognitive levels. These verbs help not only to describe and classify observable knowledge, skills and abilities but also to frame the examination or assignment questions that are appropriate to the level examiners trying to assess.

A suggestive list of skills/ competencies to be demonstrated at each of the Bloom's level and corresponding question/ verbs for tests are:

| Sr. | Level | Skill Demonstrated | Question / Verbs |
|-----|--------------------|---|------------------|
| No. | | | for tests |
| | Remember | • Ability to recall of information like, facts, | List, Define, |
| 1 | Can the student | conventions, definitions, jargon, technical | Tell, Describe, |
| 1. | recall or remember | terms, classifications, categories, and | Recite, Recall, |
| | the information? | criteria. | Identify, Show, |



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| | | Ability to recall methodology and | Label, Tabulate, |
|----|----------------------|---|---------------------|
| | | procedures abstractions, principles, and | Quote, Name, |
| | | theories in the field. | Who, When, |
| | | • Knowledge of dates, events, places. | Where |
| | | • Mastery of subject matter. | |
| | | Understanding information | Describe, Explain, |
| | Understand | Grasp meaning | Paraphrase, |
| | Can the student | Translate knowledge into new context | Restate, Associate, |
| 2. | explain ideas or | • Interpret facts, compare, contrast | Contrast, |
| | concents? | • Order, group, infer causes | Summarize, |
| | concepts: | Predict consequences | Differentiate |
| | | | Interpret, Discuss |
| | | • Use information | Calculate, Predict, |
| | Annly | • Use methods, concepts, laws, theories in | Apply, Solve, |
| | Can the student use | new situations | Illustrate, Use, |
| 3. | the information in a | Solve problems using required skills or | Demonstrate, |
| | new way? | knowledge | Determine, Model, |
| | new way. | • Demonstrating correct usage of a method | Experiment, Show, |
| | | or procedure | Examine, Modify |
| | | • Break down a complex problem into parts. | Classify, Outline, |
| | Analyse | • Identify the relationships and interaction | Break Down, |
| | Can the student | between the different parts of complex | Categorize, |
| 4. | distinguish hetween | problem. | Analyze, Diagram, |
| | the different parts? | • Identify the missing information, | Illustrate, Infer, |
| | ine aijjereni paris. | sometimes the redundant information and | Select |
| | | the contradictory information, if any. | |
| | | • Compare and discriminate between ideas | Assess, Decide, |
| | | • Assess value of theories, presentations | Choose, Rank, |
| | | make | Grade, Test, |
| | Evaluate | • Choices based on reasoned argument verify | Measure, Defend, |
| | Can the student | value of evidence recognize subjectivity | Recommend, |
| 5. | iustify a stand or | use of definite criteria for judgments | Convince, Select, |
| | decision? | | Judge, Support, |
| | | | Conclude, Argue, |
| | | | Justify, Compare, |
| | | | Summarize, |
| | | | Evaluate |
| | Create | • Use old ideas to create new ones | Design, Formulate, |
| | Can the student | • Combine parts to make (new) whole | Build, Invent, |
| 6. | create new product | Generalize from given facts relate | Create, Compose, |
| | or point of view? | knowledge from several areas predict, draw | Generate, Derive, |
| | | conclusions | Modify, Develop, |



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| - | | |
|---|--|-----------|
| | | Integrate |
| | | |

It may be noted that some of the verbs in the above table are associated with multiple Bloom's Taxonomy level. These verbs are actions that could apply to different activities.

9. Attainment of COs & POs

The process of attainment of COs, POs starts from writing appropriate COs for each course of each program.

- A correlation is established between COs and POs in the scale of 1 to 3, 1 being the slight (low), 2 being moderate (medium) and 3 being substantial (high).
- A mapping matrix is prepared for each course of the program including the elective courses.
- COs written and their mapping with POs are reviewed by Departmental academic committees before they are finalized.
- Table 1 is prepared to show the COs and the Bloom's level (BL) for a course (as sample).
- Table 2 is prepared to show the mapping of Course Outcomes (COs) with Program Outcomes (POs)/ PSOs to identify the target level. For convenience and simplicity, only one course is shown with hypothecated mapping values (sample course).
- From the mapping matrix of COs and POs for all the courses, a 'Program level target of each PO/PSO matrix' of all the courses is made.
- Table 3 is prepared to show the Target Level- Course Outcome (COs) –PO/PSO matrix for all the courses of the programme.

| Course | Course | | Course Outcomes (COs) |
|---------|---------------|--------|---|
| Code | Name | At the | completion of the course, students will be able to: |
| | | CO1 | Remember the concept of matrices and apply for solving linear |
| | | 001 | simultaneous equations |
| | | | Understand the concept of limit, continuity and differentiability |
| | | CO2 | and apply in the study of Rolle's, Lagrange's and Cauchy mean |
| | | | value theorem and Leibnitz theorems |
| KAS103T | Engineering | CO3 | Identify the application of partial differentiation and apply for |
| KASIUJI | Mathematics-I | 005 | evaluating maxima, minima, series and Jacobians. |
| | | CO4 | Illustrate the working methods of multiple integral and apply |
| | | 04 | for finding area, volume, center of mass and center of gravity |
| | | | Remember the concept of vector and apply for directional |
| | | CO5 | derivatives, tangent and normal planes. Also evaluate line, |
| | | | surface and volume |

Table 1: Course Outcomes (COs) of a course



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| Course Outcome | | Programme Outcome (PO) | | | | | | | | | | | | Programme Specific Outcome | |
|-------------------|-----|-------------------------------------|-----|---|---|---|---|---|---|----|----|----|-----|----------------------------------|--|
| Course | PO | PO | | | | | | | | | | | PSO | PSO | |
| Code & | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | |
| Name | | | | | | | | | | | | | | | |
| CO1 | 2 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 1 | 2 | 1 | |
| CO2 | 2 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | 1 | 3 | 1 | |
| CO3 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 1 | 3 | 1 | |
| CO4 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 1 | 3 | 1 | |
| CO5 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 1 | 3 | 1 | |
| Average | | | | | | | | | | | | | | | |
| (Target | 2.6 | 3 | 2.2 | 3 | 2 | - | - | - | - | - | - | 1 | 2.8 | 1 | |
| Level) | | | | | | | | | | | | | | | |

Table 2: Mapping of COs with POs / PSOs (for a course as a sample)

Table 3: Target Level COs – PO matrix for all the courses of the programme

| | | | | Pı | ogran | nme O | utcon | ne (PC |) | | | |
|----------------------|-----|----|-----|----|-------|-------|-------|--------|----|----|----|----|
| Courses | PO | PO | PO | PO | PO | PO | PO | PO | PO | PO | PO | PO |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Course 1 | 2.6 | 3 | 2.2 | 3 | 2 | - | - | - | - | - | - | 1 |
| Course 2 | 2.6 | 3 | 2.2 | 3 | 2 | - | - | - | - | - | - | 1 |
| Course 3 | | | | | | | | | | | | |
| Course 4 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Laboratory Course-1 | | | | | | | | | | | | |
| Laboratory Course-2 | | | | | | | | | | | | |
| Seminar | | | | | | | | | | | | |
| Project | | | | | | | | | | | | |
| Average Target Level | 2.6 | 3 | 2.2 | 3 | 2 | - | - | - | - | - | - | 1 |

Table 4: Target Level COs - PSO matrix for all the courses of the programme

| Courses | Programme Specific Outcome | | | | | | |
|----------|----------------------------|-------|--|--|--|--|--|
| Courses | PSO 1 | PSO 2 | | | | | |
| Course 1 | 2.8 | 1 | | | | | |



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| Course 2 | 2.8 | 1 |
|----------------------|-----|---|
| Course 3 | | |
| Course 4 | | |
| | | |
| | | |
| Laboratory Course-1 | | |
| Laboratory Course-2 | | |
| Seminar | | |
| Project | | |
| Average Target Level | 2.8 | 1 |

9.1. Direct Attainment Methods (DAM) for COs attainment

- Course Outcomes are narrower statements that describe what students are expected to know, and be able to do at the completion of each course. These expectations relate to the skills, knowledge, and behaviour that students acquire at the completion of the course.
- In a university affiliated college, the CO attainment levels can be measured based on the results of the internal assessment (Class test, Assignment/Tutorials, Seminar, Project, Lab attainment) and external examination conducted by the university. This is a form of direct measurement of attainment.
- Target level of external exams for any course will be the average of marks obtained by students of that course in the past three years.
- Target level of internal exams for any course will be as per set target (usually, 60 % of the maximum marks or average of marks obtained by students in that course calculated from CT marks in the last three years).
- Three internal assessment tests are conducted for each course in a semester. In each test, the percentage of students who achieve a set target (usually, 60 % of the maximum marks or average of marks in last three years) for the COs that are covered, is computed.
- After the three tests, the average of these percentages is computed to decide the attainment level.
- Following guidelines may be referred for arriving at an attainment level:
 - Attainment Level 1: 50% of students score more than course average (target) decided by the department with due justification,
 - Attainment Level 2: 60% of students score more than course average (target) decided by department with due justification,
 - Attainment Level 3: 70% of students score more than course average (target) decided by department with due justification.
- For the case example considered, in the internal assessment (IA) tests, the target attainment level for each CO and for each student is set at 60% of the maximum marks for a question or a group of questions. The percentage of students attaining this target level of each CO is



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computed and the average of these percentages is considered for deciding the attainment level of course outcome.

- The process of computing CO attainment in internal assessment for Class tests (CTs) is shown in Table 5. Other components of internal assessment can be calculated in the same manner (Assignment/Tutorials, Seminar, and Project). From the table, it is found that the percentages of students attaining CO1, CO2, CO3, CO4, and CO5 are 92.10 (0.9210), 92.10 (0.9210), 94.59 (0.9459), 97.43 (0.9743), 97.43 (0.9743) respectively. Hence, the average percentage of students who attained the entire COs is 94.78 (0.9478). This corresponds to Course Attainment level of 3.
- Similarly, after the declaration of the university results, the percentage of students who attained the COs is computed. Here, it is assumed that the questions answered by a student cover all the course outcomes defined for that course. From Table 5 (please refer last two columns), it is found that only 10 percent of students have scored more than 60 % of the maximum marks in the course. Hence, the attainment level in this case is 0 as per the example guidelines suggested in the SAR of NBA.
- A meeting of senior faculty & HOD with Department Academic committee members may be conducted, where the target attainment level (percent of marks scored by a student in a course) for deciding the course attainment level is redefined. The faculty may argue that this target should be set based not only on the university previous results for 3-4 years but also on the type of course and the quality of students admitted.
- In engineering programs, there are few courses which students feel rather difficult compared to other courses. In many courses, the target percent of marks scored by the students is set by the course faculty member based on the university results of the course in the institute in the past three years. Hence, for calculation purpose the average external marks in the sample subject for three years is 40 %. The target was reduced to 40 % (that is, a student should score 40 marks or more for attaining a CO).
- The guidelines for deciding the attainment levels are then modified as:
 - Attainment Level 1: 50% of students score more than 40% marks.
 - Attainment Level 2: 60% of students score more than 40% marks.
 - Attainment Level 3: 70% of students score more than 40% marks.
- From the table 5, it is found that only 86.84 % of students have scored more than 40 % of marks. Hence, the CO attainment level is 3.

Table 5: Percentage of students attaining COs and attainment level [Course 1: Introduction to Solid Mechanics (KCE402) (For example)]

| | | | | | | | | | | | | End Semester | | | | | |
|-----------------------|----------|----------|------------------|--------------------------------------|------|-----|---------------|-----------|------------|--------|--------------|--------------|-------|-------------|--------|---------|--|
| | Cou | irse | | Continuous Internal Evaluation (CIE) | | | | | | | | | | | | Exam of | |
| | Nar | ne: | (Internal Tests) | | | | | | | | | | | affiliating | | | |
| | | | | | | | | | University | | | | | | | | |
| Introduction to Solid | | | | CT 1 | (20) | | | CT 2 (20) | | | | | | DUT (100) | | Target | |
| M | echanics | (KCE402) | | CII | (30) | | | | CI. | 2 (30) | | | ru | (100) | result | Level | |
| (As sample) | | mple) | CO1 | 2 | CO2 | 2 | CO3 | 2 | CO4 | 2 | CO5 | 2 | All | 2 | All | ≥ | |
| | | | | 60% | | 60% | | 60% | | 60% | | 60% | CO | 60% | COs | 40 % | |
| Sr. | U. | Name of | MM=15 MM=15 | | | | MM=10 MM=10 M | | | MN | <i>I</i> =10 | MN | 1=100 | MN | 1=100 | | |



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| No. | Roll | Student | | | | | | | | | | | | | | |
|------------------|----------|---------------------------------------|------------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|------------------------------------|-------------------------------|------------------------------------|---------------------------------------|------------------------------------|--|---|--|---|------|
| | No. | | | | | | | | | | | | | | | |
| 1 | | Student 1 | 11 | Y | 14 | Y | Ab | NA | 7 | Y | 6 | Y | 74 | Y | 14 | N |
| 2 | | Student 2 | 5 | N | 11 | Y | 8 | Y | 9 | Y | 8 | Y | 74 | Y | 65 | Y |
| 3 | | Student 3 | 10 | Y | 13 | Y | 8 | Y | 7 | Y | 6 | Y | 44 | N | 68 | Y |
| 4 | | Student 4 | 11 | Y | 4 | Ν | 8 | Y | 7 | Y | 6 | Y | 72 | Y | 63 | Y |
| 5 | | Student 5 | 12 | Y | 11 | Y | 7 | Y | 8 | Y | 7 | Y | 74 | Y | 73 | Y |
| 6 | | Student 6 | 11 | Y | 12 | Y | 3 | N | 7 | Y | 6 | Y | 71 | Y | 43 | Y |
| 7 | | Student 7 | 11 | Y | 11 | Y | 7 | Y | 8 | Y | 6 | Y | 74 | Y | 45 | Y |
| 8 | | Student 8 | 11 | Y | 15 | Y | 8 | Y | 7 | Y | 7 | Y | 74 | Y | 18 | Ν |
| 9 | | Student 9 | 10 | Y | 11 | Y | Ab | NA | 9 | Y | 6 | Y | 70 | Y | 43 | Y |
| 10 | | Student 10 | 11 | Y | 14 | Y | 6 | Y | 7 | Y | 6 | Y | 74 | Y | 50 | Y |
| 11 | | Student 11 | 11 | Y | 5 | Ν | 8 | Y | 7 | Y | 4 | Ν | 77 | Y | 50 | Y |
| 12 | | Student 12 | 15 | Y | 11 | Y | 6 | Y | 10 | Y | 6 | Y | 74 | Y | Ab | NA |
| 13 | | Student 13 | 11 | Y | 14 | Y | 8 | Y | 7 | Y | 9 | Y | 88 | Y | Ab | NA |
| 14 | | Student 14 | 14 | Y | 11 | Y | 8 | Y | 7 | Y | 6 | Y | 74 | Y | 52 | Y |
| 15 | | Student 15 | 4 | Ν | 14 | Y | 7 | Y | 10 | Y | 6 | Y | 74 | Y | 58 | Y |
| 16 | | Student 16 | 11 | Y | 11 | Y | 8 | Y | 7 | Y | 6 | Y | 87 | Y | 58 | Y |
| 17 | | Student 17 | 11 | Y | 13 | Y | 9 | Y | 7 | Y | 6 | Y | 74 | Y | 57 | Y |
| 18 | | Student 18 | 11 | Y | 11 | Y | 8 | Y | 8 | Y | 6 | Y | 74 | Y | 34 | Ν |
| 19 | | Student 19 | 12 | Y | 11 | Y | Ab | NA | 7 | Y | Ab | NA | 74 | Y | 43 | Y |
| 20 | | Student 20 | 13 | Y | 11 | Y | 8 | Y | 7 | Y | 6 | Y | 74 | Y | 49 | Y |
| 21 | | Student 21 | 11 | Y | 10 | Y | 7 | Y | 7 | Y | 6 | Y | 74 | Y | 49 | Y |
| 22 | | Student 22 | 11 | Y | 11 | Y | 8 | Y | 7 | Y | 6 | Y | 74 | Y | 49 | Y |
| 23 | | Student 23 | 14 | Y | Ab | NA | 6 | Y | 7 | Y | 6 | Y | 69 | Y | 21 | Ν |
| 24 | | Student 24 | 11 | Y | 11 | Y | 8 | Y | Ab | NA | 6 | Y | 74 | Y | 41 | Y |
| 25 | | Student 25 | 11 | Y | 10 | Y | 7 | Y | 7 | Y | 7 | Y | 74 | Y | 44 | Y |
| 26 | | Student 26 | 13 | Y | 11 | Y | 8 | Y | 7 | Y | 6 | Y | 69 | Y | 41 | Y |
| 27 | | Student 27 | 15 | Y | 11 | Y | 8 | Y | 7 | Y | 6 | Y | 74 | Y | 44 | Y |
| 28 | | Student 28 | 11 | Y | 10 | Y | 8 | Y | 10 | Y | 6 | Y | 74 | Y | 44 | Y |
| 29 | | Student 29 | 12 | Y | 11 | Y | 9 | Y | 7 | Y | 10 | Y | 67 | Y | 41 | Y |
| 30 | | Student 30 | 10 | Y | 10 | Y | 8 | Y | 8 | Y | 6 | Y | 74 | Y | 44 | Y |
| 31 | | Student 31 | 11 | Y | 11 | Y | 8 | Y | 7 | Y | 9 | Y | Ab | NA | 48 | Y |
| 32 | | Student 32 | Ab | NA | 11 | Y | 8 | Y | 7 | Y | 6 | Y | 74 | Y | 44 | Y |
| 33 | | Student 33 | 11 | Y | Ab | NA | 3 | N | 8 | Y | 6 | Y | 74 | Y | 48 | Y |
| 34 | | Student 34 | 13 | Y | 11 | Y | 7 | Y | 7 | Y | 6 | Y | 78 | Y | 44 | Y |
| 35 | | Student 35 | 11 | Y | 12 | Y | 7 | Y | 2 | Ν | 6 | Y | 74 | Y | 44 | Y |
| 36 | | Student 36 | 6 | Ν | 12 | Y | 10 | Y | 8 | Y | 6 | Y | 74 | Y | 47 | Y |
| 37 | | Student 37 | 10 | Y | 12 | Y | 8 | Y | 7 | Y | 6 | Y | 82 | Y | 47 | Y |
| 38 | | Student 38 | Ab | NA | 11 | Y | 8 | Y | 10 | Y | 6 | Y | 31 | N | 44 | Y |
| 39 | | Student 39 | 11 | Y | 10 | Y | 9 | Y | 7 | Y | 6 | Y | 78 | Y | 23 | Ν |
| 40 | | Student 40 | 11 | Y | 3 | Ν | 9 | Y | 7 | Y | 9 | Y | 91 | Y | 44 | Y |
| | Yes | (Y) | | 35 | | 35 | | 35 | | 38 | | 38 | | 37 | | 33 |
| | No | (N) | | 3 | | 3 | | 2 | | 1 | | 1 | | 2 | | 5 |
| N | A (Not A | ppeared) | | 2 | | 2 | | 3 | | 1 | | 1 | | 1 | | 2 |
| | | | С | 01 | С | 02 | C | 03 | С | 04 | С | 05 | Al | 1 CO | Al | I CO |
| Total Y Obtained | | T_{0} Num Yes (for Y ₍₁₎ | otal aber of or CO1) = 35 | T_{0} Num Yes (fe Y ₍₂₎ | otal ber of or CO2) = 35 | T_{Num} Yes (from Y ₍₃₎ | otal aber of or CO3) = 35 | T_{0} Num Yes (fr $Y_{(4)}$ | otal aber of or CO4) = 38 | T_{0} Num Yes (for Y ₍₅₎ | otal aber of or CO5) = 38 | T Nun Yes C Y _{(al} | fotal her of (for all CO) $_{1} = 37$ | T Nun Yes (fo Y _{(all} | otal hber of or all CO) $_{rf} = 33$ | |



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| Total N Obtained | Total Number of No (for CO1) $N_{(1)} = 3$ | Total Number of No (for CO2) $N_{(2)} = 3$ | Total Number of No (for CO3) $N_{(3)} = 2$ | Total Number of No (for CO4) $N_{(4)} = 1$ | Total Number of No (for CO5) $N_{(5)} = 1$ | $Total Number of No (for all CO) N_{(all)} = 2$ | Total Number of No (for all CO) N _(all-f) = 5 | | | |
|---|---|---|---|---|--|--|--|--|--|--|
| Sum: S = Y+N | $Y_{(1)} + N_{(1)} = 38$ | $Y_{(2)} + N_{(2)} = 38$ | $Y_{(3)} + N_{(3)} =$ 37 | $Y_{(4)} + N_{(4)} = 39$ | $Y_{(5)} + N_{(5)} = 39$ | $\begin{array}{c} Y_{(all)} + N_{(all)} = \\ 39 \end{array}$ | $\begin{array}{c} Y_{(all-f)} + N_{(all-f)} = \\ & 38 \end{array}$ | | | |
| Percent Attainment of CO = $\frac{Y}{S}$ | $\frac{Y_{(1)}}{S_{(1)}} \times 100$ = 92.10 % | $\frac{Y_{(2)}}{S_{(2)}} \times 100$ = 92.10 % | $\frac{Y_{(3)}}{S_{(3)}} \times 100$ = 94.59 % | $\frac{Y_{(4)}}{S_{(4)}} \times 100$ = 97.43 % | $\frac{\mathbf{Y}_{(5)}}{\mathbf{S}_{(5)}} \times 100 \\ = 97.43 \ \%$ | $\frac{Y_{(all)}}{S_{(all)}} \times 100 = 94.87 \%$ | $\frac{Y_{(all-f)}}{S_{(all-f)}} \times 100 = 86.84 \%$ | | | |
| CO Attainment Level | 3 | 3 | 3 | 3 | 3 | 3 | | | | |
| Overall %age Attainment Level | | Total Y/Total S = (35+35+35+38+38+37) / (38+38+37+39+39+39) = 218 / 230 = 94.78 % | | | | | | | | |
| Overall Attainment Level | 3 | | | | | | | | | |

Note: Y means Yes, N means No.

- In Table 5 sample calculation method is provided for Class Tests & University final exam result only. Similarly, we can calculate the attainment level for other components of Direct Methods (Assignment/Tutorials).
- Direct Methods includes Class tests, University final exam, Assignment (TA Marks which includes Teacher Assessment plus Attendance), Seminar, Project, Lab attainment.
- In Table 6 the overall CO attainment course wise by direct methods is calculated.

Table 6: Course wise overall CO attainments (Direct Attainment Method)

| Course | | Internal exam | S | External Exams | Course wise Overall Attainment |
|------------|------------|---------------|-------------|-------------------|---|
| | Class Test | Assignment | Overall | University | {30% of Internal exams + |
| | | (TA Marks) | Internal on | Result | 70 % of end semester |
| | (From | | scale of 3 | | University exam) |
| | Table 5) | | | (From Table | |
| | (M) | (N) | (M+N)/2 | 5) | |
| Course 1 | 3 | 1 | 2 | 3 | ${(2 \times 0.3) + (3 \times 0.7)} / = 2.7$ |
| Course 2 | | | | | |
| Course 3 | | | | | |
| Course 4 | | | | | |
| | | | | | |
| Laboratory | | | | | |
| Course-1 | | | | | |
| Laboratory | | | | | |



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| Course-2 | | | | |
|----------|------|-----------------|----------------|-----|
| Seminar | | | | |
| Project | Pres | sentations & Re | eport Submissi | ons |

• Course wise CO Attainment will be calculated by taking 70 % contribution of end Semester University exam plus 30 % contribution of Internal Exams (70 % + 30 %).

The overall CO attainment level in the course considered is computed as: *Overall CO Attainment Course 1:* $-(2 \ge 0.3 + 3 \ge 0.7) = 2.7$

Similarly, we can calculate for other courses also. The above procedure of computing overall CO attainment is to be repeated for each course from first year to final year in an academic year (including opted electives, project work and technical seminars in final year) in order to enable computation of PO.

 All departments will take the approval from Dean Academic Affairs & Director of the College for the target levels (Course wise, session wise) which are decided by departments for internal & external exams. They will take one example of one course for defining internal & external targets i.e., how the targets are calculated, for remaining courses they will define all internal & external targets with procedure duly approved in department Academic committee as per specified format.

All these target levels should be framed with procedure & duly approved by the departmental Academic Committee.

9.2. Attainment of Program Outcomes (POs)

- Program Outcomes describes what students are expected to know and be able to do upon completion of graduation. These relate to the skills, knowledge, and behaviour that students acquire in the program. Various programs defined the set of POs based on the graduate attributes (GA).
- It is required to compute the attainment levels of POs. Program outcomes are attained through the attainment level / values of COs. This is called direct attainment of POs.
- The PO attainment values are computed as shown in Table 7. Sample computation of PO given as under:
 - PO 1 attainment value = (Corresponding cell value from Table 3 for Course 1 x Overall CO attainment value for course 1 from table 6) / 3 = (2.6 x 2.7) / 3 = 2.34. Similarly, we can calculate the attainment value of other POs for course-1 & other courses.
- The direct attainment of POs is the average of individual PO attainment values. From table 7, the direct attainment of PO1 is (2.34 + 2.5) / 2 = 2.42. The direct attainment of other POs is computed in the same manner and is shown in the table 7. Similarly other values can be calculated.



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| Course | PO | PO | PO | PO | PO | PO | PO | PO | PO | PO | PO | PO | PSO | PSO |
|---|------|------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| Course 1 (Assumed) | 2.34 | 1.86 | 1.72 | 2.00 | 1.46 | 1.32 | | | | | | 1.86 | 2.15 | 2.15 |
| Course 2 (Assumed) | 2.5 | 3 | 3 | 2.7 | 2.8 | 3 | | | | | | 2.6 | 3 | 3 |
| Course 3 (Assumed) | | | | | | 3 | 2.8 | 2.7 | 2.5 | 2.5 | 2.5 | | | |
| Course 4 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Seminar | | | | | | | | | | | | | | |
| Project | | | | | | | | | | | | | | |
| Overall PO Attainment by Direct Methods | 2.42 | 2.43 | 2.36 | 2.35 | 2.13 | 2.44 | 2.8 | 2.7 | 2.5 | 2.5 | 2.5 | 2.33 | 2.58 | 2.58 |

Table 7: Overall PO Attainment of Direct Assessment Methods

9.3. Indirect Attainment Methods

The indirect attainment of POs is the average of individual PO attainment values. From table 12, the average attainment of PO1 is (2.55+1.95/2 = 2.25). The indirect attainment of other POs is calculated in the same manner and is shown in the table-12.

| Indirect | PO | PSO | PSO |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|
| Methods | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| Graduate | | | | | | | | | | | | | | |
| Exit | | | | | | | | | | | | | | |
| Survey | | | | | | | | | | | | | | |
| (Annexure-2) | | | | | | | | | | | | | | |
| Curriculum | | | | | | | | | | | | | | |
| Feedback | | | | | | | | | | | | | | |
| Survey | | | | | | | | | | | | | | |
| (Annexure- | | | | | | | | | | | | | | |
| 1) | | | | | | | | | | | | | | |
| Industrial | | | | | | | | | | | | | | |
| Training | | | | | | | | | | | | | | |



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| Assessment | | | | | | | |
|--------------|--|--|--|--|--|--|--|
| Input from | | | | | | | |
| outside | | | | | | | |
| agencies | | | | | | | |
| Co- | | | | | | | |
| curricular & | | | | | | | |
| Extra- | | | | | | | |
| Curricular | | | | | | | |
| Activities | | | | | | | |
| Overall | | | | | | | |
| РО | | | | | | | |
| Attainment | | | | | | | |
| by Indirect | | | | | | | |
| Methods | | | | | | | |

Table-9: Overall PO Attainment Values

| Component | PO | PSO | PSO |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 |
| Overall PO | | | | | | | | | | | | | | |
| Attainment | | | | | | | | | | | | | | |
| Direct | | | | | | | | | | | | | | |
| Methods | | | | | | | | | | | | | | |
| Overall PO | | | | | | | | | | | | | | |
| attainment | | | | | | | | | | | | | | |
| Indirect | | | | | | | | | | | | | | |
| Methods | | | | | | | | | | | | | | |
| Overall PO | | | | | | | | | | | | | | |
| attainment | | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | | |
| Target | | | | | | | | | | | | | | |
| level from | | | | | | | | | | | | | | |
| Table-5 | | | | | | | | | | | | | | |
| Gap | | | | | | | | | | | | | | |

- As per the guidelines of the SAR, the overall attainment of outcomes of a program (POs) is computed by adding direct attainment and indirect attainment values in the proportion of 80:20. That is, 80% of direct attainment and 20% of indirect attainment is taken into consideration.
- The computed values are compared with the set target values of POs. The target values are set in consultation with the members of departmental Academic committee along with the faculty members of the program. It is argued that the target PO attainment value for each PO must be different since the contribution of courses for PO attainment is different. It is found from the



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table that all the POs are attained. An action plan for POs that do not reach the target attainment (Gap Level) value must be designed and implemented in the subsequent academic years.

10. Attainment of Program Education Objectives (PEOs)

- 1. Programme educational objectives are broad statements that describe the career and professional accomplishments that the programme is preparing graduates to achieve. The PEOs should be consistent with the mission of the College. The department shall provide the required information for assessment, evaluation and review methods to evaluate the attainment of the PEOs.
- 2. POs/PSOs will be mapped with PEOs for calculation of attainment of PEOs.

| РО | PO level | | PEO Mapping | |
|---------------------------|------------|------|-------------|------|
| | Attainment | PEO1 | PEO2 | PEO3 |
| PO1 | | | | |
| PO2 | | | | |
| PO3 | | | | |
| PO4 | | | | |
| PO5 | | | | |
| PO6 | | | | |
| PO7 | | | | |
| PO8 | | | | |
| PO9 | | | | |
| PO10 | | | | |
| PO11 | | | | |
| PO12 | | | | |
| PSO1 | | | | |
| PSO2 | | | | |
| Target Level (Average) | | | | |

Table 10: Expected target level for Program Educational Objectives (PEOs)

Table 11: Attainment of Program Educational Objectives (PEOs)

| POs & PSOs | Programme Educational Objectives (PEOs) | | | | | | | | | | |
|------------|---|------|------|--|--|--|--|--|--|--|--|
| | PEO1 | PEO2 | PEO3 | | | | | | | | |
| PO1 | | | | | | | | | | | |
| PO2 | | | | | | | | | | | |



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| PO3 | | |
|------------------|--|--|
| PO4 | | |
| PO5 | | |
| PO6 | | |
| PO7 | | |
| PO8 | | |
| PO9 | | |
| PO10 | | |
| PO11 | | |
| PO12 | | |
| PSO1 | | |
| PSO2 | | |
| Attainment Level | | |
| Target Level | | |
| Gap (if any) | | |
| | | |

11. Attainment of Mission of the Department

- 1. Mission statements are essentially the means to achieve the vision of the department and hence of the College. For example, if the vision is to create high-quality engineering professionals, then the mission could be to offer a well-balanced programme of instruction, practical experience, and opportunities for overall personality development.
- 2. Mission of the department will be mapped with PEOs.
- 3. Table 16 shows the mapping of PEOs with mission of the department.

| PE | Os | Mis | sion Stateme | ents |
|----------------------|--------------------|-----|--------------|------|
| | PEO Level Attained | M1 | M2 | M3 |
| PEO1 | | | | |
| PEO2 | | | | |
| PEO3 | | | | |
| PEO4 | | | | |
| PEO5 | | | | |
| Target Level Average | | | | |

Table 12: Mapping of PEOs with Mission

 Table 13: Attainment of Mission

| PEOs | Mission Statements | | | |
|------|--------------------|----|----|--|
| | M1 | M2 | M3 | |



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| PEO1 | | |
|--------------------|--|--|
| PEO2 | | |
| PEO3 | | |
| PEO4 | | |
| PEO5 | | |
| Average Attainment | | |
| Target Level | | |
| Gap | | |

11.1. Action for GAP fulfilment

All departments of the Institute will call Departmental Academic committees' meetings to discuss the ways these GAPs can be fulfilled. However few suggestions are framed for these departments to fulfil these gaps:

- a. Remedial classes for weak students will be arranged to improve the attainment level.
- b. Content beyond syllabus will be added to meet the requirement.
- c. Industrial visits/Industrial expert talks/Guest talks of Senior academic Personalities can be arranged for the students of the Institute.
- d. Laboratory project development by students in each year will help to map syllabus.
- e. Gap analysis will be done in at the end of each semester, gap analysis of odd semester will be done in next even semester, the action for gap fulfilment will be decided & will be implemented in next odd semester. Similarly applicable for even semester also.

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