



**AMET**  
**(ACADEMY OF MARITIME EDUCATION AND TRAINING)**  
(A *de novo* Category DEEMED TO BE UNIVERSITY Under Section 3 of UGC Act 1956)

**OUTCOME BASED EDUCATION**





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**PREAMBLE**

AMET in its pursuit of imparting quality technical education has adapted Outcome Based Education (OBE) system recommended by National Board of Accreditation (NBA) from the academic year 2015-16. It is a process that involves restructuring of curriculum, academic processes, teaching methodologies, assessment and evaluation systems in education to reflect the achievement of high order learning and are aligned with outcome based approach. It is a student-centric instruction model that focuses on measuring student performance through outcomes. Outcomes include knowledge, skills and attitudes. Reports of outcome analysis help to find curricular gaps and carryout continuous improvements in the education system of an Institute, which is very essential.





### **1. DEFINITION OF KEY STATEMENTS OF OBE:**

- **Programme** is defined as the specialization or discipline of a Degree. It is the interconnected arrangement of courses, co-curricular and extracurricular activities to accomplish predetermined objectives leading to the awarding of a degree. For Example: B.E., Marine Engineering
- **Graduates Attributes (GAs)** are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. GAs form a set of individually assessable outcomes of the programme.
- **Programme Outcomes (POs)** explain the Knowledge, Skills and Attitude that the students are expected to attain upon graduation. POs are expected to be aligned closely with Graduate Attributes.
- **Program Educational Objectives (PEOs)** describe the career and professional developments of graduates, which are to be assessed during the first few years of graduation.
- **Programme Specific Outcomes (PSOs)** Programme Specific Outcomes are what the students should be able to do at the time of graduation with reference to a specific discipline.
- **Course Syllabus provides** a comprehensive description of a curriculum offered by the respective programme of study from Board of Studies.
- **Course Outcomes (COs)** Course outcomes are statements that describe the course understandings to be acquired by the students at the end of a course.
- **Course End Survey** Analysis is a technique to measure the attainment of COs indirectly through a questionnaire.
- **Rubrics** are scoring guides that assess and articulate specific components and expectations of an assignment. Rubrics are used for grading courses like Projects, Internships, and Soft Skills Etc.



## **2. IMPLEMENTATION OF OBE IN AMET**

AMET offers Degree Programmes in Engineering, Technology, Management, Science, Commerce and Maritime disciplines. University has robust procedure for the design and development of the curricula for Degree Programmes in compliance with various statutory bodies such as All India Council of Technical Education (AICTE), University Grants Commission (UGC) and Directorate General of Shipping (DGS). Engineering, Technology and Management programmes are governed by AICTE; Science and Commerce programmes governed by UGC; Maritime Programmes governed by DGS; University is governed by Ministry of Education.

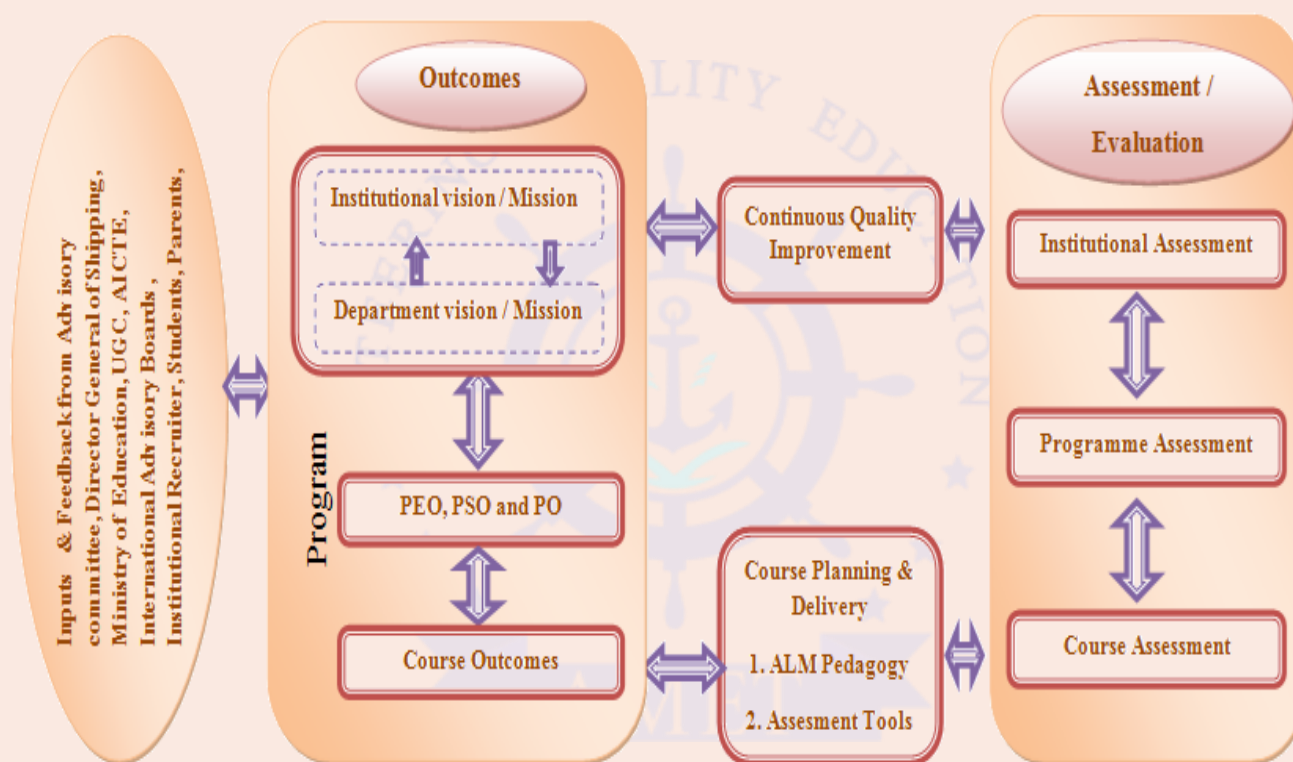
### **KEY COMPONENTS OF OBE:**

- Vision and Mission of the Institute
- Vision and Mission of the Department
- Programme Educational Objectives (PEOs)
- Graduate Attributes (GAs)
- Programme Outcomes (POs)
- Programme Specific Outcomes (PSOs)
- Course Outcomes (COs)

The Graduate Attributes of all programmes are adopted from the Washington Accord in line with the Vision and Mission of the University. Curricula and syllabi of all the programmes are framed by considering the inputs or guidelines from UGC/AICTE, Professional bodies, Stakeholders, Department Vision And Mission, POs, PSOs, PEOs and University Regulations. The syllabus for each course has been designed to meet the

Compliance of the curriculum for attaining the POs and PSOs defined for the Program and Course Outcomes are framed for all courses. The mappings between CO and PO has been prepared for all the courses available in the curriculum [The PEOs, PSOs of all programs offered by AMET can be found in the AMET website].

University has implemented Outcome Based Education, which involves outcome based curriculum design, outcome based learning & teaching and Outcome based assessment since 2015-2016. OBE is widely publicized to all the stakeholders through our website and by various other means such as induction program, orientation sessions etc. The teaching and learning process is augmented with modern ICT tools and Student centric Activity learning Methods (ALM). The OBE structure of the institution is shown in figure1.



***Fig.1: OBE Structure of the Institution***



### **3. COURSE OUTCOMES**

Course outcomes are the statements of Knowledge/ Skills/ Attitude that students are expected to know, understand and perform as a result of their learning experiences.

#### **3.1 GUIDELINES FOR WRITING COURSE OUTCOME STATEMENTS:**

Well written COs facilitate in measuring the attainment of COs at the end of the semester. Course Outcomes are written for all courses. It also helps the faculty in designing suitable delivery and assessment methods to achieve the designed COs. New COs are developed when a new course is offered and existing COs are revised upon feedback from stakeholders.

Course Outcomes are written by using

- Action verbs with Knowledge Levels as per Bloom's Taxonomy.
- Subject content.
- Modes of performing task.

The mapping between COs and POs has been prepared for all the courses available in the curriculum. The strength of correlation of individual COs of a course with POs and PSOs is indicated as "3" for substantial (High) Correlation, "2" for moderate (medium) correlation and "1" for slight (low) correlation. The COs prepared for all the courses are given in the Curriculum and Syllabus. The syllabus for each course has been designed to meet compliance of the curriculum for attaining the POs and PSOs defined for the Program. Program Articulation Matrix and Course Articulation Matrix are framed for each Program. Mapping analysis of each courses are maintained in the department which are evaluated based on the set attainment levels by the department.

#### **3.2 ASSESSMENT AND ATTAINMENT OF COURSE OUTCOMES**

Assessment methods are categorized as direct method and indirect methods to assess COs attainment. Direct assessment method and indirect assessment method are considered for 90% and 10% of weightages respectively.



**[i] Direct Assessment Method:**

In Direct Assessment Method, evaluation of Course Outcome is done through internal and external assessment processes such as CAT1, CAT2, Model Examination, End Semester Examination, Assignments and Seminar or any Activity Learning Methods (ALM). The Direct Assessment tools is as below in Table 1.

**Direct Assessment Tools:-**

*Table1: Direct Assessment Tools*

Assessment Process	Frequency	Process
<b>DIRECT ASSESSMENT TOOLS</b>		
<b>THEORY</b>		
Continuous Assessment Test (CAT)	Two per semester	The internal assessments are carried out in a centralized manner in the Department level and are so designed to facilitate the assessment of the attainments of the outcome.
Model Exam	One per semester	The Model examination is of three hour duration and covers the entire syllabus of the course and satisfies all course outcomes for the particular course
End Semester Examination	As per the End semester exam schedule	The end semester examination is of three hour duration and covers the entire syllabus of the course and satisfies all course outcomes for the particular course.
Assignments	Two / Three Assignments per course	Assignments are given to assess the critical and analytical skills of the students, and is taken as a tool to assess the attainment of Cos
Seminar/ALM	One per Course	Seminar topics are given to the students to improve their communication skills, gaining thorough knowledge in the subject, networking with others, renewing motivation and confidence which is also taken as a method to assess the attainment of Cos
<b>LABORATORY COURSES</b>		
Performance Evaluation	Continuous monitoring	Continuous Evaluation of Laboratory courses as per the lab schedule





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End Semester Exam	As per the End Semester Examination schedule	The end semester examinations are of three hour duration and cover all the experiments of the course and satisfy all course outcomes.
<b>MINI PROJECT</b>		
Reviews	1. First review 2. Second review	Student groups are mentored by a Faculty and periodic reviews are conducted to monitor and evaluate the progress of the project in meeting the objectives, efficiency and sustainability.
End Semester Viva-voce	As per the Practical Examination Schedule	Depending on the relevance, project objectives and rubrics, projects are evaluated and the students are graded
<b>PROJECT WORK</b>		
REVIEWS	1. Zeroth review 2. 1 <sup>st</sup> review 3. 2 <sup>nd</sup> review	Student groups are mentored by a faculty and periodic reviews are conducted to monitor and evaluate the progress of the project in meeting the objectives, effectiveness, efficiency, impact and sustainability
Viva –voce	As per the Practical Examination Schedule	Depending on the relevance, rubrics, level of achievement of project objectives, projects are evaluated and the students are graded
<b>INTERNSHIPS</b>		
Presentation	One per semester	Rubric based assessment.
<b>PERSONALITY DEVELOPMENT PROGRAM</b>		
<b>SOFT SKILLS</b>		
Continuous evaluation process	Throughout the semester	Assessment process includes Interactions with questions structured properly and analyzing student's communication and writing abilities
<b>INDUSTRIAL VISITS</b>		
Review	A minimum of one Industrial visit per semester.	To achieve the learning outcome more qualitatively, industrial visits are organized and the students are assessed based on rubrics



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<b>PHYSICAL EDUCATION</b>		
Performance Evaluation	Continuous monitoring	Continuous Evaluation of physical fitness and activities as per the schedule
Fitness assessment	One course per degree program	Student assessment is done in alignment with University standards and rubrics
<b>VALUE ADDED COURSES</b>		
Training module	One Course per Semester	To make the students industry fit, Value Added Courses are conducted. The students are certified after the completion of the course and are assessed based on rubrics.

**[ii] Indirect Assessment method:**

Course End Survey Analysis is a technique to measure the attainment of COs indirectly from the components of Course Outcomes. Course End Survey is an integral part of assessment process. Surveys are conducted for all courses as a step towards quality measure. The survey includes a questionnaire set for each course outcome. This system gives a measure of the program outcomes attained indirectly which forms an essential element to improvise on course goals. The Indirect assessment tools of evaluation is given below in table.2

**Indirect Assessment Tools:**

***Table2: Indirect Assessment Tools***

<b>S.No</b>	<b>Assessment Tool</b>	<b>Frequency</b>	<b>Method Description</b>
1	Course End Survey	End of semester	To enhance the Teaching Learning Process, Students are provided with an opportunity to reflect and provide feedback based on their understanding level and is taken an indirect assessment tool for the attainment of CO's.

The strategy by which indirect assessment is carried out is shown in Table 3

***Table 3: Strategy for Indirect Survey***

Indirect Survey	Total No of students
Survey Questions for every course outcome of course	Number of Students Answered - 1 (Low)
	Number of Students Answered - 2 (Medium)
	Number of Students Answered - 3 (High)
	Total Number of Students Participated
	Total Number of Students Answered 2 & 3
Indirect COs Attainment Percentage	Total No Of Students answered 2 &3 / Total No of Students

The Attainment of Course Outcomes at the end of every semester is evaluated and analyzed

### **3.3 IDENTIFYING THRESHOLD VALUE FOR COURSES:-**

One among the following ways is followed for setting the subject threshold.

- The class average is set as subject threshold
- 60% of the maximum mark obtained in a class is set as subject threshold
- Average of previous three academic year's performance of a particular subject is set as subject threshold.
- If the curriculum is revised, then the subject threshold value is set by the instructors for his/her course.

### **3.4 THE METHODOLOGY FOR SETTING ATTAINMENT LEVEL FOR COURSES:-**

The attainment of Course Outcomes (CO) is measured in terms of actual percentage of students getting the set subject threshold. A sample strategy for setting the attainment level of Course Outcomes is shown below in table 4.



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**Table 4: Strategy for setting attainment level of Course Outcomes**

<b>ATTAINMENT LEVEL FOR COURSE OUTCOMES</b>	
<b>Theory Courses , Laboratory Courses &amp; Employment Opportunity Courses</b>	
<b>Overall Attainment Level (Direct assessment + Indirect Assessment)</b>	<b>Level</b>
50% - 60% students scoring more than the set subject threshold	1
>60% - 70% students scoring more than the set subject threshold	2
> 70% of students scoring more than the set subject threshold	3

In each course, the level of attainment of each CO is compared with the predefined target level. If the set target levels are not attained, the course coordinator takes necessary steps for improvement to reach the target. If targets are achieved, it is expected to set higher targets for the following years as a part of continuous improvement

### **3.5 THE OVERALL CO ATTAINMENT PROCESS:**

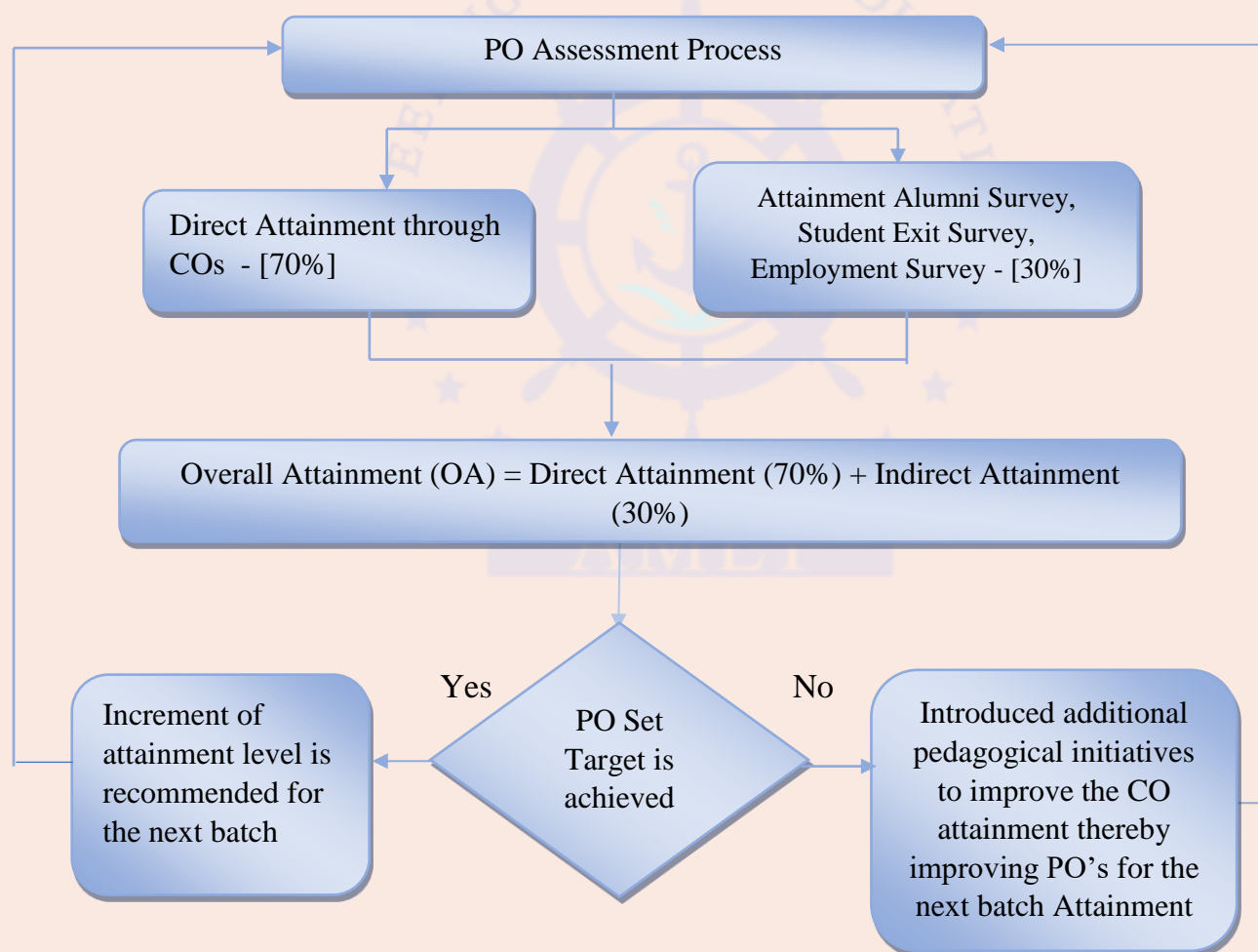
The overall attainment for every course outcome is calculated as shown below in table 5.

**Table 5: The Overall CO Attainment Process**

<b>S.No</b>	<b>Process for CO attainment</b>	<b>CO attainment</b>					
		<b>CO 1</b>	<b>CO 2</b>	<b>CO3</b>	<b>CO4</b>	<b>CO5</b>	<b>CO6</b>
1	% Of Direct Attainment Through Internal Exams(CAT I & II, Model exam, Assignment I,II & ALM	40% From Direct Attainment Through Internal Exams					
2	% Of Direct Attainment Through End Semester Exam	60% From Direct Attainment Through End Semester Exam					
3	40% + 60% Of Direct Attainment	Total Attainment through Direct Assessment Methods					
4	% Of Indirect Attainment Through Course End Survey	10% From Indirect Attainment Through Course End Survey					
5	<b>90% From Direct + 10% From Indirect For CO Attainment</b>	<b>Overall COs Attainment of a course</b>					

#### **4. PROGRAM OUTCOMES**

The Program Outcomes (PO) and Program Specific Outcomes (PSO) are achieved through Course Outcomes (CO) for each course, which is incorporated in the syllabus. The attainment of Program Outcomes (POs)/ Program Specific Outcomes (PSOs) is measured by considering 70% from the attainment of Course Outcomes and 30% from Indirect Survey done through Student Exit Survey, Alumni Survey and Employer Survey with weightages of 15%, 10% and 5% respectively. Based on the attainment of Course Outcomes, the DAC committee discusses and sets the threshold for Program Attainment. The process for PO attainment is shown in figure 2.



***Fig 2: The Process of PO Attainment***



## **5. STRUCTURE AND FUNCTIONS OF OBE COMMITTEES**

### **[i] INTERNAL QUALITY ASSESSMENT CELL :**

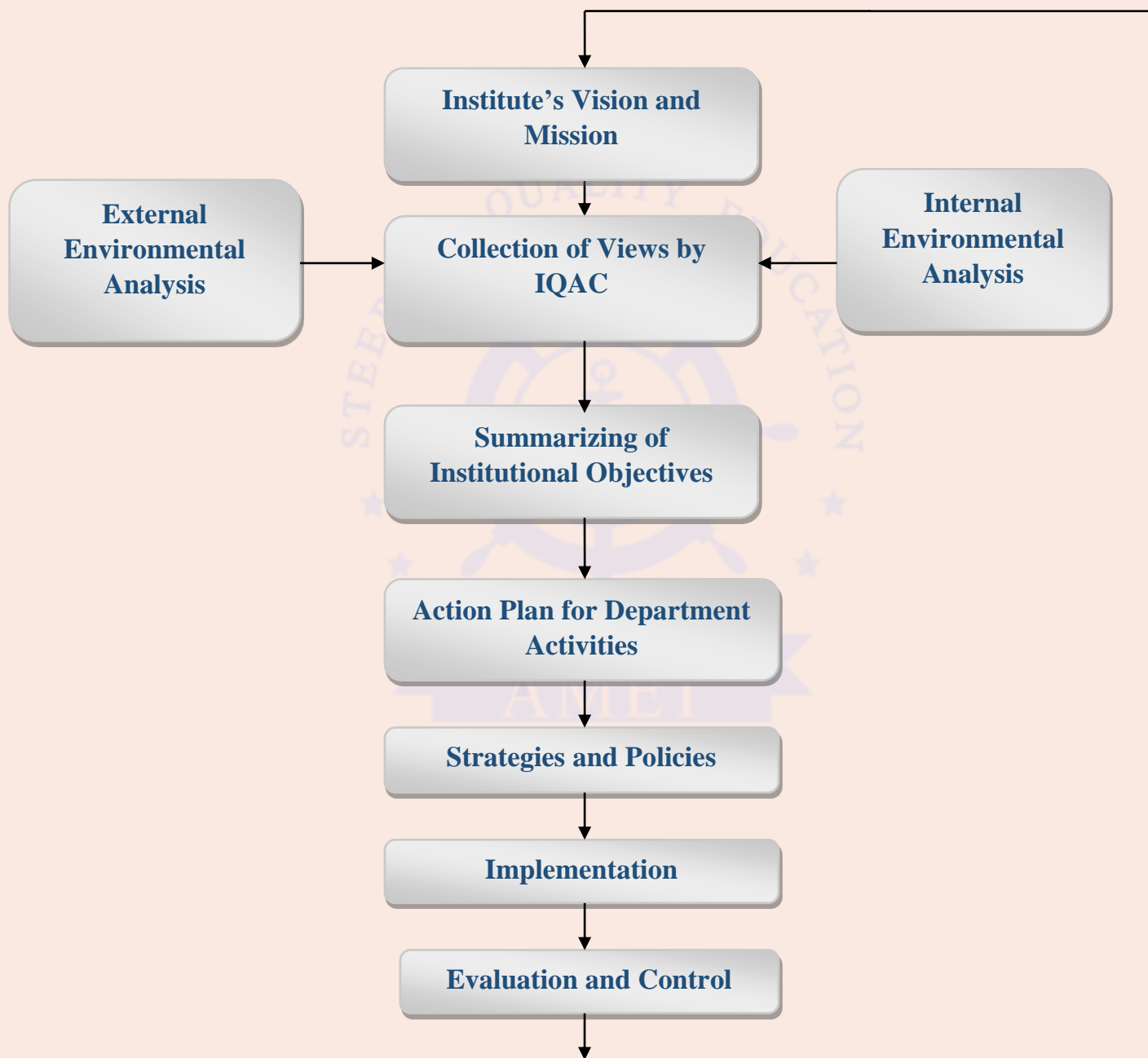
- Vice Chancellor as Chairperson
- A few administrative officers as members
- Teaching Faculty
- One member from the Management
- Nominees from local society, Industry and Students
- Distinguished academicians
- A Teaching Faculty as Coordinator

### **Functions:**

- Ensuring timely, efficient and progressive performance of academic and administrative tasks
- Enhancing the quality of academic and research programmes
- Making the University environment and academic programmes accessible for all sections of the society
- Enhance the Institutional Social Responsibilities
- Advice upon the modern methods of teaching and learning
- Creation of credible feedback mechanisms
- Ensuring secure and transparent evaluation system
- Advice upon the enhancement of physical infrastructure
- Making the Green Campus by inculcating environmental consciousness
- Ensuring the availability and maintenance of support structure and services
- Enhance the collaborations with Industry, Academia and other spheres of the society
- Development of quality benchmarks for various academic and administrative activities of the Institution
- Arrangement for feedback response from students, parents and other stakeholders on quality-related institutional processes
- Dissemination of information on various quality parameters of higher education



- Organization of inter and intra institutional workshops, seminars on quality related themes
- Documentation of the various programmes/activities leading to quality improvement
- Acting as a nodal agency of the Institution for coordinating quality-related activities, including adoption and dissemination of best practices.



*Fig 3 Functions of IQAC*



**[ii] DEPARTMENT ADVISORY COMMITTEE:**

**Members:**

- Vice-Chancellor
- Head of Department: Chairperson
- Dean Academics of the institute
- Program Coordinators of UG and PG programs
- Representative of parents
- Representative of alumni
- Representative of industry
- Representative of academics
- Representative of Teaching Faculty
- Representative of Non-Teaching Faculty
- Representative of Student.

**Functions:**

The Department Advisory Committee meets once a year and its functions are:

- To establish PEOs and PSOs based on Vision and Mission of the University, Department, and Graduate Attributes.
- To revise PEOs and PSOs, if necessary, based on the report submitted by IQAC and PAC.
- To submit report to IQAC on evaluation of attainment of COs, POs and PEOs.
- To consider recommendations for achievement of PEOs and POs given by PAC for approval.
- To Set the threshold for POs attainment and formulate guidelines for attainments of the same.





**[iii] PROGRAM ASSESSMENT COMMITTEE:**

**Members:**

- Head of the Department: Chairperson
- Specialized course coordinators
- Department Faculty Members

**Functions:**

The Program Assessment Committee meets twice per semester and its functions are:

- To evaluate the competency matrix of faculties for every semester.
- Allotment of subjects based on competency matrix.
- Preparation of Department Academic Calendar for every semester.
- To finalize assessment methods, ALM techniques and attainment strategies.
- To recommend revision of courses, new courses and value added courses when necessary.
- To review gap analysis report of subjects and suggestion of remedial action based on the same.
- To draft and revise survey feedback forms ie. Alumni Survey, Employer Survey, Parent Survey, Exit Survey to assess the attainment of POs.
- To conduct and analyze results of above mentioned surveys and Course End Survey with the help of respective faculty coordinators.
- To assess the attainment of the PEOs, POs, PEOs and COs.
- To submit a report on “Evaluation and Attainment of PEOs, POs and COs to DAC

**[iv] SPECIALIZED COURSE CO-ORDINATORS**

Every Department Curriculum is decomposed into different category of courses so that attainment of COs common to a particular category of courses becomes easier. Specialized Course Coordinator Meetings are conducted before the beginning of



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semester, after each internal assessment test and at the end of semester to continuously evaluate the attainment of course outcomes. Their function is:

- To take responsibility of a particular course and support the planning, development, course quality and delivery of the course.
- To promote collegial and team-based approaches to academic work.
- To evaluate attainment of COs of the course.
- To develop appropriate Course Objectives and Course Outcomes.
- To design CO survey forms.
- To solicit feedback from course stakeholders in relation to course design and delivery process.

