

Vasavi College of Engineering (Autonomous)

Ibrahimbagh, Hyderabad - 500031

**Process Manual
for
CO PO Attainment**

2016-17

w.e.f July 2016

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CHAPTER 1: Institute Vision and Mission

VISION

Striving for a symbiosis of technological excellence and human values

MISSION

To arm young brains with competitive technology and nurture holistic development of the individuals for a better tomorrow

CHAPTER 2: Process for Defining Vision and Mission

The department must establish the Vision and Mission through a consultation process involving the stakeholders of the department, considering the societal requirements. The department's Vision and Mission are framed within the department that are derived from the Institutional Vision and Mission statements. The Programme Assessment Committee (PAC) circulates these statements among the stakeholders of the programme such as Industry, Faculty, Alumni, Parents & Employer and collects the views to refine the draft Vision and Mission statements. These draft statements are forwarded to the Department Committee (DC) to look into the relevance and consistency with the Vision and Mission of the institute. The DC consolidates these statements and the statements that are presented to the Board of Studies for suggestions. The Academic council will approve the finalized Vision and Mission statements of the department as shown in figure 2.1. The department takes measures to disseminate these statements among the stakeholders.

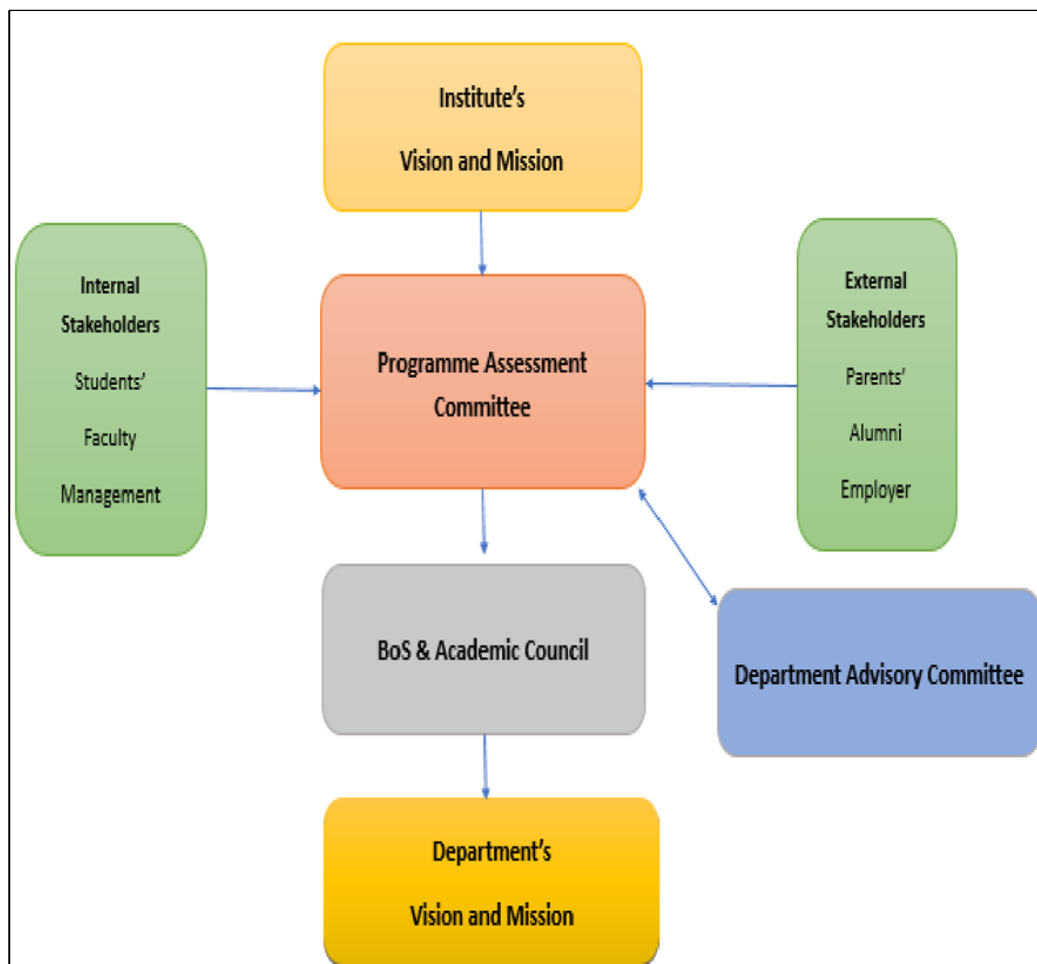


Fig 2.1: Process of defining Vision and Mission Statements

Appropriateness of Vision of the department with the Institute Vision:

Institute envisions maintaining the right balance in technological excellence and human values by the end of the course of study. The measure of these can appropriately be observed through the placements, internships, innovative project work, extracurricular activities and outreach programmes.

Appropriateness of Mission of the department with the Institute Mission:

The department mission statement must be inline with the institute mission, i.e., to nurture holistic development of the graduates for a better tomorrow. Students' participation in competitions, extra curricular and co-curricular activities, faculty and students' certifications, association with the Industry and the project work are some of the initiatives for holistic development of a student.

CHAPTER 3: Programme Educational Objectives (PEOs)

3.1 Program Educational Objectives (PEOs): PEOs are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Process of defining PEO's: Program Educational Objectives are broad statements that determine what the programme is preparing graduates for their career and professional life. These statements are designed inline with the Vision and Mission statements of the institute, Vision and Mission statements of the department and the Programme Outcomes. Programme outcomes are statements that define what graduates are able to do by the time they graduate. The programme aims at achieving the educational objectives through these Outcomes and the Process of defining PEOs is given in the figure 3.1.

The programme assessment committee will prepare PEO's by collecting views from the stakeholders such as Faculty, Students', Alumni, Employer and Parents'.

The department advisory committee deliberates on the PEO's submitted by the PAC, recommends modifications and forwards the draft PEO's to the BoS for suggestions.

BoS reviews the PEO's and submits its recommendations. The final version of the PEO's are forwarded to the Academic Council by the department for approval.

The approved PEO's are disseminated to all the stakeholders by the department.

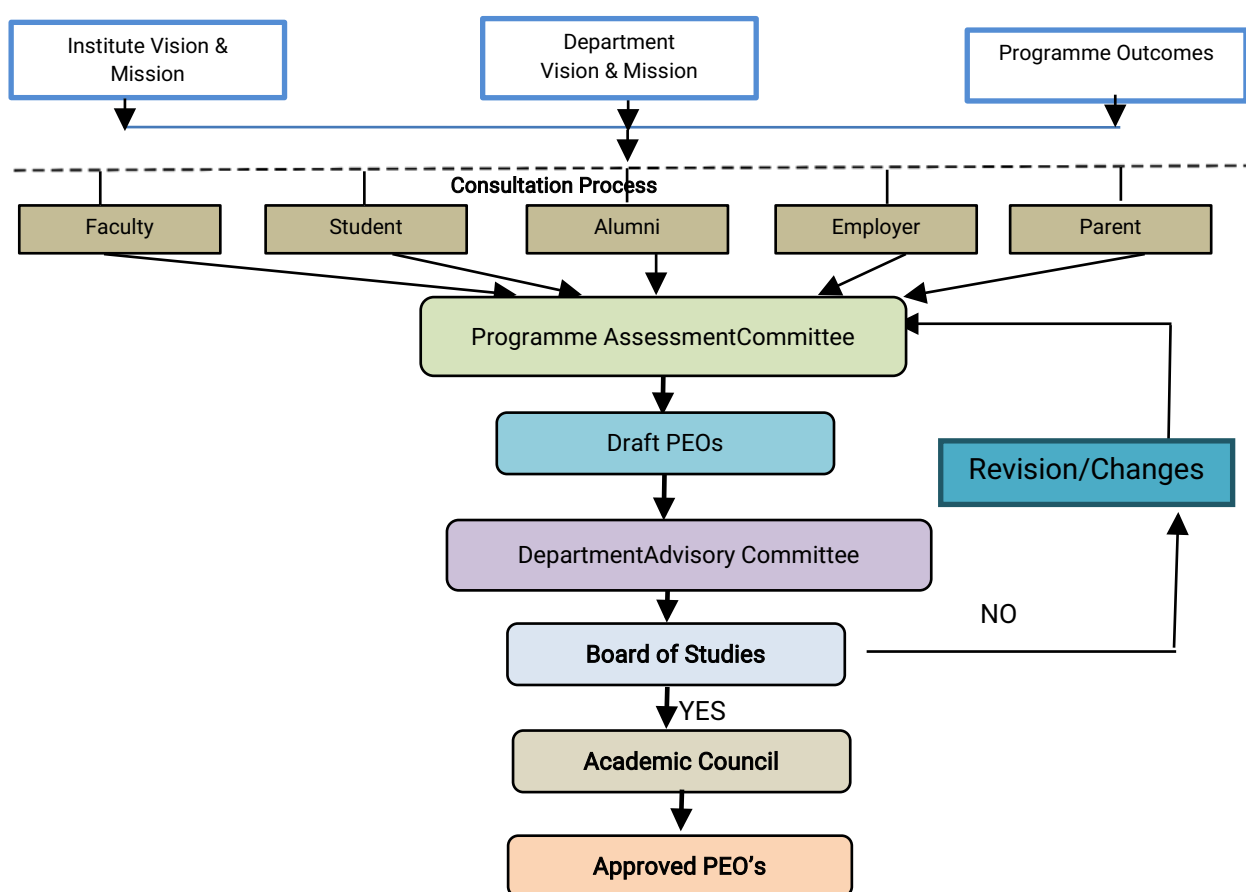


Fig 3.1: Process of defining PEO's

3.2 Dissemination of Vision, Mission and PEO's

The Mission, Vision and PEOs are widely publicized through the following ways

Table 3.1: Dissemination of Vision, Mission & PEOs

Category of Media	Medium/Place of Dissemination	Stakeholders
Print Media	Student Handbook	Students, Faculty, Parents
	Syllabus Books and Lab Manuals	Students and Faculty
	Department Newsletters	Students, Faculty, Alumni, Employers and Parents
	Conference/Workshop Brochures	Students, Faculty, Alumni, Employers, Parents and Society
	Conference Proceedings	Students, Faculty, Alumni, Employers, Parents and Society
	Course Files	Faculty, External Resource Person
Display Media	HOD Office	Students, Faculty, Supporting Staff, All visitors
	Faculty Room	Students, Faculty, Supporting Staff, All visitors
	Common Areas	Students, Faculty, Supporting Staff, All visitors
	Laboratories	Students, Faculty, Supporting Staff, All visitors
	Notice Boards in the Department	Students, Faculty, Parents, Supporting Staff, On campus recruiters, Invited speakers, Alumni, All visitors
Electronic Media	College Website	Students, Faculty, Alumni, Employers, Parents and Society
	Alumni website (https://www.vcealumni.org/page/d	Students, Faculty, Alumni, Employers, Parents and

	Departments-vision-and-mission)	Society
Communication Media	Emails	Students, Alumni
	Conference website	Faculty, Resource persons, Participants, Professional Bodies
Interactions	Stakeholders Meeting	All stakeholders in the meeting
	Alumni Meet	Alumni
	Induction Program for First year students	Students, Parents
	Orientation Program for Lateral Entry students when they take admission in Second year	Students, Parents
	Board of Studies Meetings	Faculty, BoS Members, External Experts, Alumni
	Parents Teacher Meeting	Students, Parents

3.3 Process of Dissemination among Stakeholders

Institute Vision, Mission, Department Vision, Mission and PEOs, POs & PSOs are disseminated as follows:

Table 3.2: Process of Dissemination

S. No.	Stakeholder	Frequency
1	To All first year admitted students and parents during first day of Induction program through Power Point Presentation by Head of the Department.	Once every year
2	To All lateral entry students admitted in 3rd Semester and parents on the day of joining the program through PowerPoint Presentation by the Head of the Department.	Once every year
3	To All Second Year students during orientation for choosing open electives.	Once every semester
4	To All Third Year students during orientation for choosing open electives.	Once every semester
5	To students of all years during the semester through Department Newsletter	Once every semester
6	To students of all years during the semester through technical magazine - ByteQuest	Once in Fortnight

7	To outgoing students through the exit Survey Questionnaire	Once every year
8	To faculty and society through the workshop, conference brochures and outreach programmes	For every activity
9	To alumni through alumni survey	Once every year
10	To academicians and industry experts through the BoS meetings	Twice every year

CHAPTER 4: Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)

The Institute started adopting Outcome Based Education (OBE) in 2012. The main objective of implementing OBE is to impart education by adopting a student centric approach and deliver outcome oriented teaching for the students. Every programme identifies Program Outcomes (POs), Program Specific Outcomes (PSOs), and Course Outcomes (COs) in accordance with the vision and mission statements of the programme.

4.1 Program Outcomes (POs)

Program Outcomes (POs) represent the student learning outcomes that are defined as the knowledge, skills, or behaviours that a student should be able to demonstrate upon completion of the programme and are statements written in accordance to the graduate attributes.

PO1 - Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 - 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.

PO3 - 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.

PO4 - 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.

PO5 - Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6 - 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.

PO7 - 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.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - 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.

P011 - 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.

P012 - 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.

4.2 Programme Specific Outcomes (PSOs)

Program Specific Outcomes (PSOs) are specifically defined outcomes of the programme which the graduates have to acquire by the end of the programme.

The following are the various means for disseminating Program Outcomes (POs), Program Specific Outcomes (PSOs) of all Programmes:

Print Media	Student Handbook
	Syllabus Books
	Department News Letters
Display Media	HOD Room
	Faculty Room
	Common Areas
	Laboratories
	Department Library
	Notice Boards in the Department
	Other prominent locations in the department
Electronic and Communication Media	Web site - www.vce.ac.in
	Emails
	Conference website
	Stakeholders Meeting
	Alumni Meet

CHAPTER 5: Course Outcomes

5.1 Bloom's Taxonomy:

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.

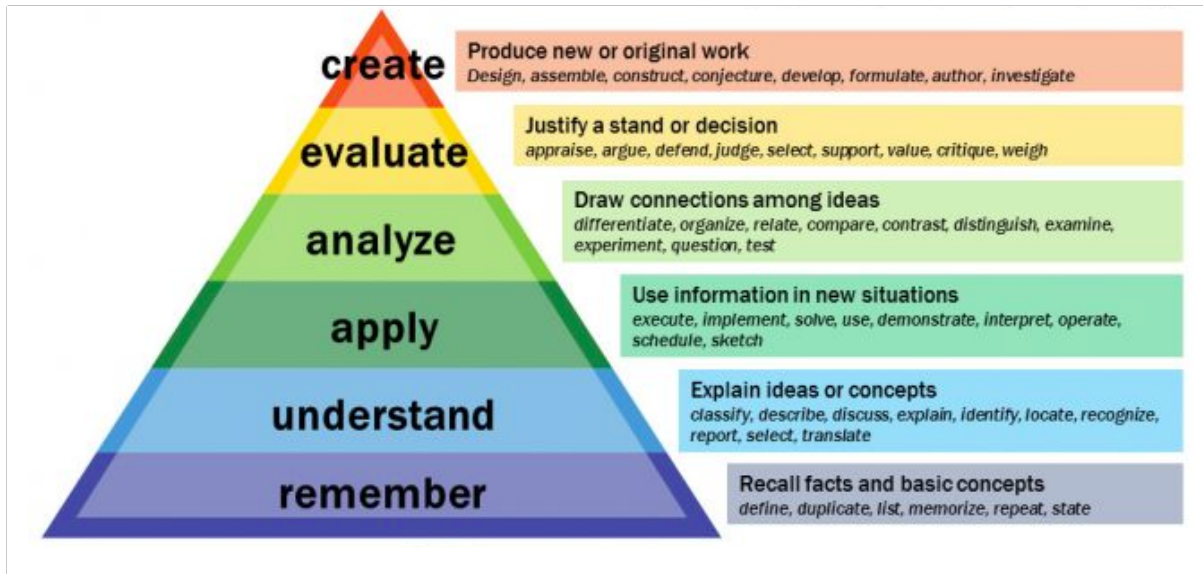


Fig 5.1: Bloom's Taxonomy

Remembering: the basic recall of information presented through various methods. When we "remember" something, we are able to name it, locate it, define it, etc. We are able to take the content and paint a visual for the learner.

Understanding: the demonstration of what we remember. When we "understand" something, we are able to apply that knowledge in a myriad of ways. We may compute, illustrate, or show others how we interpret that particular concept.

Applying: the solving of problems associated with basic understanding: When we "apply" something, we try to understand its relevance in new situations.

Analyzing: the investigation of the concept for which we previously demonstrated understanding. When we "analyze" something, we break it down so that we can find connections that make the parts a whole.

Evaluating: the process in which the content is examined for validity. When we "evaluate" something, we have to prepare for debate and discussion on prior analysis.

Creating: the development or production of new ideas based on an extensive

assessment of a concept. When we “create” something, we are able to build new and interesting phenomena based on the discernment we gained from the previous stages of the model.

Table 5.1 Revised Bloom’s Taxonomy Action Verbs

REVISED Bloom’s Taxonomy Action Verbs						
Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom’s Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	<ul style="list-style-type: none"> Choose Define Find How Label List Match Name Omit Recall Relate Select Show Spell Tell What When Where Which Who Why 	<ul style="list-style-type: none"> Classify Compare Contrast Demonstrate Explain Extend Illustrate Infer Interpret Outline Relate Rephrase Show Summarize Translate 	<ul style="list-style-type: none"> Apply Build Choose Construct Develop Experiment with Identify Interview Make use of Model Organize Plan Select Solve Utilize 	<ul style="list-style-type: none"> Analyze Assume Categorize Classify Compare Conclusion Contrast Discover Dissect Distinguish Divide Examine Function Inference Inspect List Motive Relationships Simplify Survey Take part in Test for Theme 	<ul style="list-style-type: none"> Agree Appraise Assess Award Choose Compare Conclude Criteria Criticize Decide Deduct Defend Determine Disprove Estimate Evaluate Explain Importance Influence Interpret Judge Justify Mark Measure Opinion Perceive Prioritize Prove Rate Recommend Rule on Select Support Value 	<ul style="list-style-type: none"> Adapt Build Change Choose Combine Compile Compose Construct Create Delete Design Develop Discuss Elaborate Estimate Formulate Happen Imagine Improve Invent Make up Maximize Minimize Modify Original Originate Plan Predict Propose Solution Solve Suppose Test Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

5.2 Course Outcomes: Course Outcomes (COs) are clear statements of what students should be able to demonstrate upon completion of a course. They should be measurable.

Process of defining Course Outcomes:

The course outcomes of each course are prepared by the course coordinator in consultation with the faculty teaching the same course. The COs must be prepared in accordance with the three domains of learning, i.e., Cognitive, Affective & Psychomotor. A Course Outcome should Start with an Action verb from Bloom's taxonomy set of verbs. For every course, four- six COs are drafted in accordance with the changes in Curriculum, they are discussed in the Department committee and modified based on the suggestions if any. Approval for the Syllabus containing COs is obtained from the Board of Studies (BoS).

Sample Course Outcomes:

Web Programming and Services (PC610CS)

CO No.	Course Outcome
	At the end of the course, Students will be able to
PC610CS.1	Apply HTML, CSS & JavaScript to design web pages.
PC610CS.2	Develop applications using JDBC API to connect to a database.Design XML documents and apply styles using XSLT.
PC610CS.3	Explain architectural styles and develop dynamic web applications using Servlets.
PC610CS.4	Design and develop server side programs using JSP & PHP.
PC610CS.5	Publish web services and explain serverless computing

CHAPTER 6: CO-PO and CO-PSO Mapping

6.1 Correlation Matrices

The COs of every course are published in the syllabus copy, and on the department page of the institute website. The following correlation matrices maintained by every programme in the Outcome Based Education.

1. COs to POs and COs to PSOs: Course outcomes of each course are mapped to the Program Outcomes with a level of correlation value as 3: being highly correlated 2: being medium correlation and 1: being low correlation. Similarly, a correlation table is maintained for COs that have a correlation value to PSOs
2. Course to POs and Course to PSOs: Average of the correlation values of all Course outcomes corresponding to a single PO derives the Course – PO mapping. Similarly, a correlation table is maintained for Course that have an average correlation value to PSOs.
3. Survey questionnaire (SQ) to POs and Survey questionnaire to PSOs: Average of the correlation values (3: being highly correlated 2: being medium correlation and 1: being low correlation) of all questions corresponding to a single PO derives the SQ – PO mapping. Similarly, a correlation table is maintained for Survey questionnaires that have an average correlation value to PSOs.
4. Program level statistics - For every batch of outgoing students, the programme outcome assessment is measured through the student participation in various co-curricular and extra-curricular activities. Few tools used for measuring include students' participation in workshops/ seminars/ conferences/ paper presentations/ internships/ MOOC course completion/ Guest Lectures etc. are prepared. Each of these activities are mapped to POs and PSOs. Average of the correlation values (3: being highly correlated 2: being medium correlation and 1: being low correlation) of all questions corresponding to a single PO derives the Program level statistics – PO mapping. Similarly, a correlation table is maintained for Program level statistics that have an average correlation value to PSOs.

Eg: CO to PO Mapping for Computer Programming

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	2	3	2	1								
C02	3	2	2	2	1							1
C03	2	1	1	1								2
C04	3	1	1	1								1
C05	3	2	2	2	1							1

Course to PO Mapping for Computer Programming

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CP	2.6	1.8	1.6	1.4	1							1.25

CO to PSO Mapping for Computer Programming

PSO	PSO1	PSO2	PSO3
C01	2		
C02	3		
C03	3	1	1
C04	2	1	
C05	3	1	1

Course to PSO Mapping for Computer Programming

PSO	PSO1	PSO2	PSO3
CP	2.6	1	1

The Course to PO, Course to PSO mapping must be defined and justification must be included in the course file. The mapping is ratified by the Programme Assessment Committee.

Programme Articulation Matrix (sample)

Program articulation matrix depicts the correlation between the courses and Programme Outcomes

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
HS110EH									3	3		3
BS110MA	3	2.8										2.8
BS120PH	3	2										1
BS130CH	3	2					1.8					1.4

ES110CS	2.6	1.8	1.6	1.4	1							1.3
ES120EE	3	2	1		1	1	1	1	1	1		1
ES130CE	2	2								2		
HS111EH									3	3		3
BS111PH	3	2.8		2								2
BS121CH	3	2							2			1
ES111CS	2.6	2	2	1.8	1							
OE310MA	1	1										1
OE310ME	2		2	1.7	2.3							
PC311CS	2.6	2.4	1.8	1	1				1			1
ES321EC	3	2	2.5	1					1.3			
BS410MA	3	2										1
PC530CS	1.8	2.4	2	1		1						1
PC540CS	2.2	2.5	2.5	1	1							1.6
HS500EH			2	2					1		2	1
HS510EH												2
PE850CS	3	2	1									
PW819CS	2	3	2.5	3	3	2	1.8	3	3	3	2	3

Chapter 7: Assessment Tools

Various tools used for assessing the attainment of each Course Outcome.

1. Assignments
2. Quizzes
3. Examinations (Internal & Semester)
4. Laboratories
5. Mini-projects
6. Presentation (Seminars, Projects)
7. Reports (Seminars, Projects)
8. Viva-voce

Assignments, quizzes and examinations contribute to the assessment of students' ability to apply fundamental concepts; quantitative, numerical and analytical skills. Assignments are given frequently to the students, which involve application of concepts for solving a wide range of problems. Each of these assessment tools test the abilities of the students at various cognitive levels as described in Table 5.1.

Continuous evaluation of Laboratory work and mini projects contribute towards the assessment of necessary skills to implement ideas and techniques.

Project work evaluation contributes towards the assessment of necessary skills to use modern tools and demonstrate proficiency in the chosen field of interest. Reports, presentation and viva-voce contribute to the assessment of communication skills and dissemination of ideas.

These assessments listed in Table 7.1 are carried out periodically and hence allow the faculty members to continuously monitor and help the students to attain the course outcomes.

Table 7.1 Tools

S. No	Tool	Frequency
1	Evaluation of theory subjects	3 times per semester
2	Quizzes	3 times per semester
3	Assignments	3 times per semester
4	Evaluation of Laboratories	3 times per semester
5	Project Work	Presentations: 2 times per semester & Viva-voce: 1 time per semester
6	Seminars	2 times per semester

The following tables show the rubrics for assessment of Project work, seminars, ECA and CCA activities

Table 7.2 Rubrics for Project Seminar

Grade/Criteria	Satisfactory (1)	Good (2)	Very Good(3)	Outstanding (4)
Literature Survey & Selection of a topic	Moderate literature review and Fair description of the selected topic	Moderate literature review and Clear description of the selected topic	Good literature review and Good description of the selected topic	Very Good literature review and Very Good description of the selected topic
Presentation	Fair Presentations of the selected topic	Clear Presentations of the selected topic	Good Presentations of the selected topic	Very Good Presentations of the selected topic
Communication	Fair description of the Concept/Techniques related to the selected topic	Clear description of the Concept/Techniques related to the selected topic	Good description of the Concept/Techniques related to the selected topic	Very Good description of the Concept/Techniques related to the selected topic
Documentation	Fair documentation of the Selected topic	Clear documentation of the Selected topic	Good documentation of the Selected topic	Very Good documentation of the Selected topic
Conclusion	Fair conclusion of the selected topic	Clear conclusion of the selected topic	Good conclusion of the selected topic	Very Good conclusion of the selected topic

Table 7.3 Rubric used for Project Work/Mini Project Evaluation

Grade/Criteria	Satisfactory (1)	Good (2)	Very Good(3)	Outstanding (4)
Literature Survey	Moderate literature review and no references	Moderate literature review and incomplete	Good literature review and proper references	Very Good literature review and proper references

		references		
Problem Analysis	Fair description of the problem statement	Clear description of the problem statement	Good description of the problem statement	Very Good description of the problem statement
Design/ Methodology	Methodology is suitable, described properly but no system design	Methodology is suitable, described properly and system design is included	Methodology is suitable, described properly and system design is included with explanation of its adoption	Methodology is suitable, described properly and system design is included with explanation of its adoption and examples
Implementation, Results & Conclusion	Result is explained and brief discussion is provided	Result is explained and moderate discussion is provided	Result is explained and good discussion is provided with respect to the problem statement	Result is explained and thorough discussion is provided with respect To the problem statement
Presentation & Documentation	Clear presentation of the problem statement with documentation	Good presentation of the problem statement and documentation	Good presentation of the problem statement and good documentation	Very good presentation of the problem with well documentation

However there is a flexibility given to the Departments to devise their own rubrics

Table 7.4 Rubric for CCA Activities

Criteria	Score		
	3	2	1
Guest lectures	Number of guest lectures conducted are greater than or equal to 6 in four years	Number of guest lectures conducted are between 3 to 5 in four years	Number of guest lectures conducted are less than 2 in four years

Workshops	Number of student workshops conducted are greater than or equal to 3 in four years	Number of student workshops conducted is two in four years	Number of student workshops conducted is one in four years
Student competitions	Number of student competitions conducted are greater than or equal to 6 in four years	Number of student competitions conducted are between 3 to 5 in four years	Number of student competitions conducted are between less than 3 in four years
Internships	Number of students attending internships are greater than or equal to 10 for program with one section and 20 for program with two sections.	Number of students attending internships are between 3 to 9 for program with one section and 6 to 18 for program with two sections	Number of students attending internships are less than 3 for program with one section and 6 for program with two sections
Professional Practice School	Conducted greater than or equal to two weeks PPS training to students	Conducted one week PPS training to students	Conducted less than one week PPS training to students
Industrial Visit	Conducted greater than or equal to three industrial visits	Conducted two industrial visits	Conducted less than two industrial visits
Student presentations	100% of the students have given presentations.	90 – 99 % of the students have given presentations.	Less than 90 % of the students have given presentations.
Theme Based Projects	100% of the students have done theme based projects	90 – 99 % of the students have done theme based projects	Less than 90 % of the students have done theme based projects
MOOC courses	100% of the students passing out complete MOOC courses	50 – 100 % of the students passing out complete MOOC courses	Less than 50% of the students passing out complete MOOC courses

	P01	P02	P03	P04	P05	P06	P07	P08	P09	PO 10	PO 11	PO 12
CRT	1	3								3		3

Table 7.5 Rubric for ECA Activities

Criteria	Score		
	3	2	1
NSS (includes Sahay, Street cause and all extension activities)	Number of activities are greater than or equal to 4	Number of activities are 3	Number of activities are 1 or 2
Extra-curricular clubs	100% of the students participate in the club	90 – 99 % of the students participate in the club	Less than 90 % of the students participate in the club
Sports	Number of activities are greater than or equal to 8	Number of activities are between 6 or 7	Number of activities are between 1 to 5
Entrepreneurship (SWAYAM/ED CELL)	Number of activities are greater than or equal to 4	Number of activities are between 2 or 3	Number of activity is 1
Inter institute literary and cultural activities	Number of activities are greater than or equal to 10	Number of activities are between 5 to 9	Number of activities are between 1 to 4

Chapter 8: CO Attainment

8.1 PROCESS USED FOR CO ATTAINMENT:

CO Attainment is calculated using the performance of every student through the Continuous Internal Evaluation (which includes Assignments, Quiz and Internal exams) and the Semester end examinations. The below figure 8.1 shows a flowchart that describes the process used for CO Attainment.

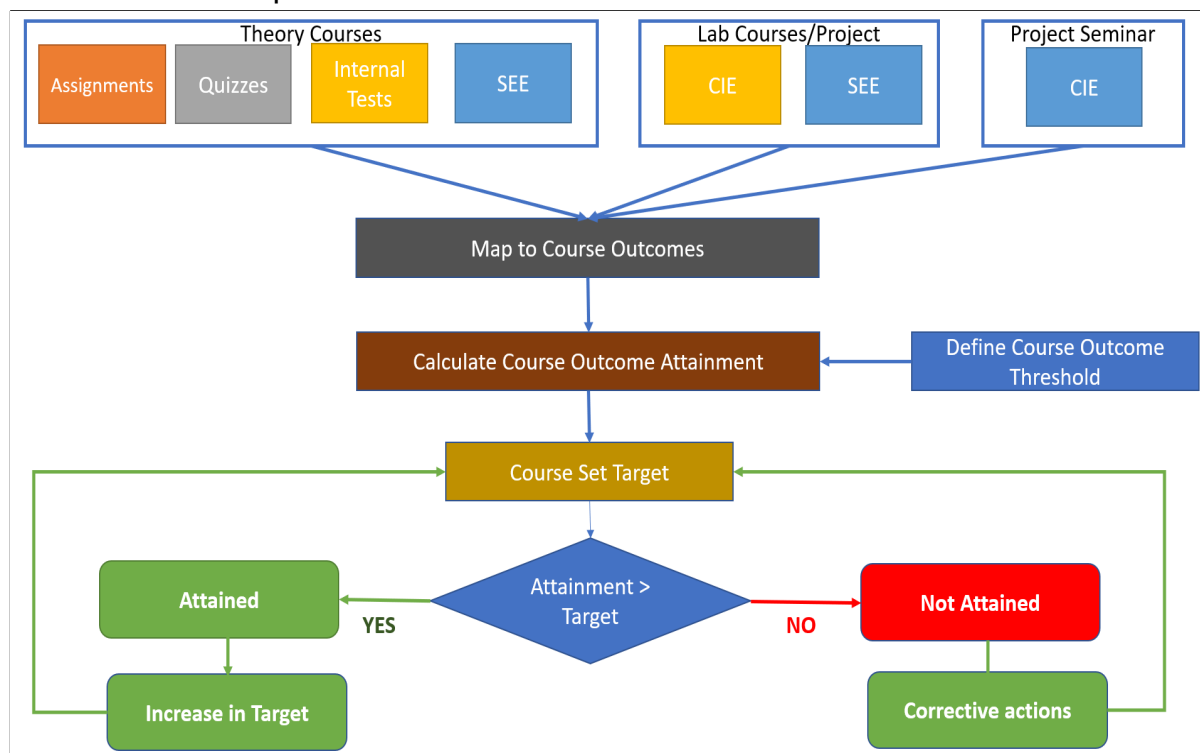


Fig: 8.1: Course Outcome Attainment Process

a. Metrics used for CO Attainment:

The course outcome attainment is computed by using the following metrics

Threshold: Is the minimum percentage of marks that students have to score in a course. We have set the threshold as $\geq 60\%$ marks.

CO Attainment Levels: Every course will have to set the CO attainment levels using the set threshold. Three attainment levels namely attainment levels 3, 2, 1 have been identified as shown below, where 3 is the highest and 1 being lowest. Each level is defined as the % of students scoring more than the threshold.

Attainment Level is 3: if $\geq 60\%$ of students scoring $\geq 60\%$ marks

Attainment Level is 2: if $\geq 50\%$ to $< 60\%$ of students scoring $\geq 60\%$ marks

Attainment Level is 1: if $< 50\%$ of students scoring $\geq 60\%$ marks

However there is a flexibility given to the Departments to change the thresholds and attainment levels to assess the course outcome attainment in the following way

The Program coordinator is required to monitor that the same attainment levels to be followed for all the courses within the programme.

Course Set target: Before the start of the course, a Set Target is kept as a baseline for achieving the course attainment.

A course Set Target value if attained is based on the average of the Course attainments for the last three years or 5 to 10% improvement in course attainment of previous year. In addition course coordinators are given flexibility to set their own targets according to the nature of the course and performance of the previous attainments in consultation with the Program Coordinator.

If the Course attainment is less than the Set Target in the current academic year, then the Set Target for the next academic year is retained *and corrective actions* are planned with regard to course delivery, question paper quality improvement, usage of tools, invited lectures etc.

b. CO Attainment procedure

Assignments, Quizzes and Internal exams question papers are framed to test the students level of understanding of all COs. Each question framed in these assessment tools are mapped against the course outcomes. Marks obtained by each student for each question are entered for outcome analysis. The attainment computation is done by computing the average of the marks obtained by all the students for all questions that correspond to a particular CO, which are greater than the threshold. The calculated average of the CO is compared with the Attainment Levels as described above.

c. Measuring CO attainment through Internal Assessments:

Each course sets the Thresholds and Target based on which CO Attainment calculation and analysis is performed upon. Once the attainment computation is calculated, the attainments are recorded for each of the assessment tools.

The CO attainment calculation for the CIE assessment tool is mentioned below in the Figures 8.2, 8.3, 8.4

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD-500031
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CO Attainment – I – Internal Exam

Faculty: _____ Date: _____
Course : _____ Academic Year: _____
Year /Semester: _____ Class: _____ Strength of the Class : _____

Question No.	1	2	3	4	5	6	7 (a)	7 (b)	8(a)	8(b)	9 (a)	9 (b)
Max Marks												
No of Students >= 60% marks												
% of students >= 60%												
CO1												
CO2												
CO3												
CO4												
CO5												

Course Outcome	CO1	CO2	CO3	CO4	CO5
CO Attainment (Avg.)					
CO Attainment Level					

Attainment Rubrics:
Level 3: >=60% students scoring >=60% marks
Level 2: >=50% to <60% students scoring >=60% marks
Level 1: <50% students scoring >=60% marks

(Signature of the faculty)

Fig 8.2: CO Attainment for Internal I

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD-500031
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CO Attainment – II – Internal Exam

Faculty: _____ Date: _____
Course : _____ Academic Year: _____
Year /Semester: _____ Class: _____ Strength of the Class : _____

Question No.	1	2	3	4	5	6	7 (a)	7 (b)	8(a)	8(b)	9 (a)	9 (b)
Max Marks												
No of Students >= 60% marks												
% of students >= 60%												
CO1												
CO2												
CO3												
CO4												
CO5												

Course Outcome	CO1	CO2	CO3	CO4	CO5
CO Attainment (Avg.)					
CO Attainment Level					

Attainment Rubrics:
Level 3: >=60% students scoring >=60% marks
Level 2: >=50% to <60% students scoring >=60% marks
Level 1: <50% students scoring >=60% marks

(Signature of the faculty)

Fig 8.3: CO Attainment for Internal II

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD-500031
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CO Attainment – Assignments –Quizzes

Faculty : _____ Date: _____
 Course : _____ Academic Year: _____
 Year /Semester : _____ Class : _____
 Strength of the Class: _____

	Assignment (Avg.)	Quiz (Avg.)
Max Marks		
No of Students >= 60% marks		
% of students >= 60%		
CO Attainment Level		

Attainment Rubrics:
 Level 3: >=60% students scoring >=60% marks
 Level 2: >=50% to <60% students scoring >=60% marks
 Level 1: <50% students scoring >=60% marks

(Signature of the faculty)

Fig 8.4: CO Attainment for Assignments & Quizzes

d. Measuring CO attainment through Semester End Examinations

CO attainment for a course in Semester end Examination is measured as mentioned above for internal assessment. The weightages for all assessment tools used for calculation are presented in the tables 8.1, 8.2, 8.3, 8.4 respectively.

Table 8.1: Calculation of CO attainment for Theory Courses

Assessment Tool	Weightage
Quizzes	5%
Assignments	5%
Internal tests	30%
Semester End Exam	60%

Table 8.2: Calculation of CO attainment for Lab Courses

Assessment Tool	Weightage
Internal tests	37.5%
Semester End Exam	62.5%

Table 8.3: Calculation of CO attainment for Seminar

Assessment Tool	Weightage
Continuous Internal Evaluation (CIE)	100 %

Table 8.4: Calculation of CO attainment for Project

Assessment Tool	Weightage
Project Grade	100%

The Figure 8.5 shows the CO attainment for Semester End Examinations

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD-500031

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CO Attainment – Sem-End Exam

Faculty: _____ Date: _____
 Course : _____ Academic Year: _____
 Year /Semester: _____ Class: _____ Strength of the Class : _____

Question No.	1	2	3	4	5	6	7	8	9	10	11 (a)	11 (b)	12 (a)	12 (b)	13 (a)	13 (b)	14 (a)	14 (b)	15 (a)	15 (b)	16 (a)	16 (b)	17 (a)	17 (b)	17 (c)
Max Marks																									
No of Students >= 60% marks																									
% of students >= 60%																									
CO1																									
CO2																									
CO3																									
CO4																									
CO5																									

Course Outcome	CO1	CO2	CO3	CO4	CO5
CO Attainment (Avg.)					
CO Attainment Level					

Attainment Rubrics:
 Level 3: >=60% students scoring >=60% marks
 Level 2: >=50% to <60% students scoring >=60% marks
 Level 1: <50% students scoring >=60% marks

(Signature of the faculty)

Fig 8.5: CO Attainment for Sem End Exams

Final course outcome attainment is calculated based on the number of credits offered for the course

For Ex: Final Course attainment calculation for a 3 credit course with the total marks for internal exam is 20, assignment is 5marks, quiz is 5marks and semester end exam is 70 marks will be obtained by considering 20% weightage to Continuous Internal Evaluation, 5% to the Assignments, 5% to the Quizzes and 70% weightage to Semester end examination.

Course Attainment = 20% of Internal Exams + 5% of Assignments + 5% of Quizzes +70% of Sem-End Exam (SEE)

Chapter 9: CO Attainment Analysis

Course Attainment's are submitted to the class assessment committee along with the CO attainment analysis sheet in the following format. The areas of improvement are identified and an action plan is chalked out.

VASAVI COLLEGE OF ENGINEERING (Autonomous) IBRAHIMBAGH, HYDERABAD-500031 DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING					
					Date:
Course Outcome (CO) Attainment Analysis					
Name of the Faculty CSE-A: CSE-B:				Academic Year:	
Year:		Semester:		Section:	
Course:					
	CO1 Attainment	CO2 Attainment	CO3 Attainment	CO4 Attainment	CO5 Attainment
Internal Exams					
Sem-End Exam					
CO Attainment – Internal Exams	CO Attainment – Assignments	CO Attainment – Quizzes	CO Attainment – Sem-End Exam (SEE)	Course Attainment	Course Set Target
Attainment Status:					
Observations:					
1.					
2.					
3.					
Action Plan for Improvement:					
1.					
2.					
3.					
HOD, CSE			(Signature of the Faculty)		

Attainment Rubrics:

Level 3: $\geq 60\%$ students scoring $\geq 60\%$ marks

Level 2: $\geq 50\%$ to $< 60\%$ students scoring $\geq 60\%$ marks

Level 1: $< 50\%$ students scoring $\geq 60\%$ marks

Course Attainment = 30% of Internal Exams + 5% of Assignments + 5% of Quizzes + 60% of Sem-End Exam (SEE)

Fig 9.1: CO Attainment Analysis

The Course Attainment is compared with the Course set target. If the course attainment is greater than or equal to the course set target then the course is Attained, else Not Attained as shown in the figure 9.1 above

A table with all the courses outcomes, co attainment, set target along with status to be listed.

Table 9.1 Attainment Levels for all the courses (sample)

Course Code	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	CO 7	CO Attainment	Course Set Target	Attained
HS110EH	2.25	2.5	2.25	2.25	2.75			2.4	2.3	Attained
PC410CS	3	2.6	3	2.6	2.3			2.70	2.16	Attained
PC420CS	3	3	1.95	3	1.85			2.56	2.7	Not Attained
PC430CS	2.1	2.1	2.1	2.2	2.3			2.16	2.4	Not Attained
PC440CS	2.9	2.65	2.3	3	2.65			2.70	2.7	Attained
HS410EH	3	1.8	2.1	2.4	1.8			2.22	2	Attained
MC320CE	2.2	2.2	2.2	2.2				2.20	2.25	Not Attained
PC520CS	3	2	3	3	1			2.40	2.4	Attained
PC530CS	2.7	2.7	2.6	2.2	2.7			2.58	2.63	Not Attained
PC540CS	3	3	3	2.5	3			2.90	1.9	Attained
.										
.										
.										
.										
HS500EH	3	2.9	2.55	2.8	1.5			2.55	1.6	Attained
MC500EH	3	2.9	2.8	2.9	2.9	2.8		2.88	3	Not Attained
HS510EH	3	3	3	3	3			3.00	2	Attained
MC510CS	3	3	3	3				3.00	2	Attained
PE610CS	2.82	2.82	2.82	2.82	2.82			2.82	2.45	Attained
HS610EH	3	2.1	3	2.1				2.55	2	Attained
MC610CS	3	3	3	3				3.00	2.25	Attained
PC611CS	3	3	3	3	3			3.00	2.73	Attained
PC621CS	3	3	3	3	3			3.00	2.75	Attained
PC631CS	2.6	2.6	2.6	2.6	2.6			2.60	2.02	Attained
PW619CS	3	3	3	3	3			3.00	3	Attained
PE850CS	3	2.6	2	2	2.6			2.44	2	Attained

Chapter 10: PO and PSO Attainment

10.1 Tools and processes used in assessment of the achievement of POs

Type of Assessment tool	Assessment Tool	Assessment Criteria	Data Collection Frequency
Direct	Course Performance	Number of Students passed	Once every semester
Indirect	Alumni Survey	Level of Achievement	Once every year
Indirect	Parents Survey	Analysis of Responses	Once every year
Indirect	Student Exit Survey	Analysis of Responses	Once every year
Indirect	Employer Survey	Performance of Alumni	Once every year
Indirect	Co-Curricular Activities	Participation and contribution	Once every year
Indirect	Extra Curricular Activities	Participation and contribution	Once every year

Assessment Tools used:

1. Direct Assessment Tools

Assignment - The assignment is a qualitative performance assessment tool designed to assess students' knowledge of engineering practices, framework, and problem solving at the knowledge, application, and synthesis levels of Bloom's taxonomy. Evaluation will be done by the subject faculty to assess students' knowledge with respect to the learning outcomes associated with the scenario tool.

Quiz - Quiz is a theory-based examination conducted as a surprise test consists of Multiple-Choice Questions and Subjective Questions that test the students' knowledge in engineering, analytical and problem solving skills and their capability to provide solutions to engineering problems. Evaluation will be done by the subject faculty to assess students' knowledge with respect to the learning outcomes associated with the scenario tool.

Internal Examination - This type of performance assessment is carried out twice a semester. Every internal exam tests the students' course outcome attainment at all levels of Bloom's Taxonomy such as remembering, understanding, applying, analyzing, evaluating and creating.

Semester End Examination - Semester End examination is a metric for assessing whether all the POs are attained or not. Examination is more focused on attainment of course outcomes and program outcomes using a descriptive exam testing the students at all levels of Bloom's taxonomy.

Rubrics - A rubric explains to students the criteria against which their work will be judged with the “scoring rules”. It is used by faculty in assessing the course outcome attainment in projects and seminars during third year and final year. This tool is designed to evaluate the students’ capability of self- learning, innovativeness and team management and communication skills. It makes a public key criterion that students can use in developing, reviewing, and judging their own work.

2. Indirect Assessment Tools

Survey reports - Indirect assessment strategies include Graduate/Exit Survey, Alumni Survey, Employer Survey and Parent Survey. Exit survey is conducted every year for the passing out batches. Alumni Survey is conducted during alumni meets and whenever alumni visit the campus. Employer Survey and Parent Survey are conducted annually.

Program level statistics - For every batch of outgoing students, the programme outcome assessment is measured through the student participation in various co-curricular and extra-curricular activities. Few tools used for measuring include students’ participation in workshops/ seminars/ conferences/ paper presentations/ internships/ MOOC course completion/ Guest Lectures etc. are prepared.

10.2 Attainment of POs and PSOs:

PO attainment levels and PSO attainment levels are based on attainment levels of direct and indirect assessment tools. For the overall attainment of each PO and PSO, 80% weightage is given to direct assessment and 20% weightage is given to indirect assessment. The assessment process involved in the assessment of PO/PSO is shown in the Figure. 10.1.

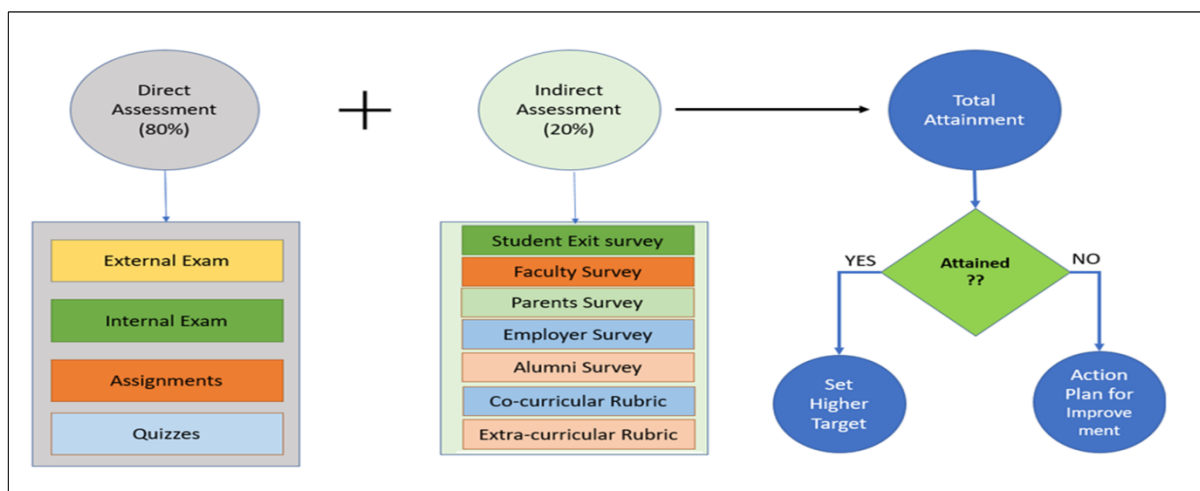


Fig: 10.1: PO PSO Attainment Procedure

Eg: To compute the PO attainment and PSO attainment for the batch of students graduating in the academic year 'AY', we need to consider the Course to PO & PSO matrices and the respective course outcome attainments of the students as follows.

1st year I Semester & II Semester courses of AYm3 Academic year

2nd year I Semester & II Semester courses of AYm2 Academic year

3rd year I Semester & II Semester courses of AYm1 Academic year

4th year I Semester & II Semester courses of AY Academic year

Set Target for PO/PSO:

To compute the set target for PO/PSO the average attainment of the last 3 years is considered for 2016-20 batch, the average attainment of the last two is to be considered for 2015-19 batch and previous year attainment for the 2014-18 batch.

A small flexibility is given to Departments to check the influence of POs by considering the POs under three categories i.e. Knowledge, Skills and Attitude with an increase of 5% in set target in subsequent years if PO is attained.

The PO/PSO attainment of a course is computed by taking the weighted average of Course outcome attainment with mapping.

Course Outcome	CO Attainment	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
1	2.3	1			2	3				1			1
2	3	1	2	2	2	3				1			
3	2.3	1	2	2	2	3				1			1
4	3	1	2	2	2	3				1			1
5	1.6	1	2	2	2	3				1			1
Course to PO attainment		2.4	2.5	2.5	2.4	2.4				2.4			2.3

Table 10.1: PO Attainment for the Graduating Batch – Direct Attainment

Course code	Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
HS11EH	English-I									2.4	2.4		2.4
OE430PH	Fundamentals of Cryogenics	2.5	2.5			3	3						2.5
OE450PH	Fundamentals of Thin Film Technology	2.8	2.8										2.8
OE440PH	Smart Materials and Applications	2.1	2.1										2.1
PC411CS	Java Lab	3	3	3	3	3		3	3				3
PC421CS	Operating System Lab	3	3	3	3	3		3					3
PC510CS	Database Management Systems	2.6	2.6	2.7	2.7								2.6
PC520CS	Microprocessors and Interfacing	2.4	2.5	2.3	2.4	2.4							
PC530CS	Computer Networks	2.6	2.6	2.6	2.7		2.7						2.7
.													
.													
.													
.													
PC621CS	Software Engineering Lab	3	3	3	3	3							
PC631CS	Compiler Construction Lab	2.6	2.6	2.6	2.6		2.6						
PC720CS	Internet of Things	2.2	2.3	2	2	2	3						
PE710CS	Elective-II: Data Mining	2.1	2.1	2				2.1					2
PE780CS	Elective-III: Information Security	2.2	2.2				2.1		2.1				

Direct attainment level of a PO & PSO is determined by taking average across all courses addressing that PO and/or PSO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
DIRECT ATTAINMENT	2.65	2.62	2.64	2.65	2.70	2.69	2.84	2.84	2.76	2.77	2.77	2.64

Table 10.2: PO Attainment for the Graduating Batch – Indirect Attainment

Indirect Assessment tools are mentioned below. Each of these tools have questionnaires which contain questions that can be mapped strongly, moderately and weakly to the programme outcomes. The Departments are given flexibility to map questionnaires with POs.

Example:

<i>Alumni Survey</i>	<i>P O 1</i>	<i>P O 2</i>	<i>P O 3</i>	<i>P O 4</i>	<i>P O 5</i>	<i>P O 6</i>	<i>P O 7</i>	<i>P O 8</i>	<i>P O 9</i>	<i>P O 10</i>	<i>P O 11</i>	<i>P O 12</i>	<i>Attai nmen t</i>	<i>Attai nmen t Level</i>
The study of basic sciences and core engineering helped you in analyzing the problems at your workplace/higher studies	3												79.03	3
Are you able to identify and define the requirements for a given problem which is appropriate to its solution?		3											81.30	3
Are you able to design/develop a component/process/algorithm as per the specified requirements at your workplace?			3										79.49	3
Are you able to conduct investigations to solve complex engineering problems?				3									76.62	3
Are you able to select and use modern engineering/IT tools at your workplace?					3								77.68	3
Are you able to take contextual decisions in your professional engineering practice by considering societal and cultural issues?						3							77.98	3
Are you able to apply the knowledge of societal/environmental contexts, while arriving at a professional engineering solutions?							3						74.96	3
Are you able to work in a respectful and ethical manner with team members to complete the task?								3					87.78	3
Are you able to work effectively as an individual and/or in multidisciplinary teams?									3				86.73	3

Are you able to comprehend and communicate effectively using appropriate verbal, non-verbal communication and documentation skills?										3			82.81	3
Are you able to handle the projects/allocated works as an individual, also as a member in a team by applying engineering and management principles?											3		85.37	3
Have you taken any certification/short-term courses to enhance your professional career? Have you contributed to publications, patents or scientific knowledge? Give brief information Have you received any Awards/Recognition? Give brief information												3	55.27	3
Parent Survey	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	Attai nmen t	
Are you satisfied with the performance of your son/daughter?	1	1	1	1	1	1	1	1	1	1	1	1	78.97	3
As you satisfied with the improvement in the personality of your son/daughter as compared to the time of joining the Institute?	2	2	2	2	2	2	2	2	2	2	2	2	77.95	3
There is improvement in the studentas communication skills as compared to the time of joining the Institute?	3	3	3	3	3	3	3	3	3	3	3	3	75.90	3
How well did we do in transforming your ward into a good and responsible citizen so far?						1	2	3		1		2	80.00	3
Exit Survey	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	Attai nmen t	
The PEOs and POs need modification to meet the student aspirations	3	3	3	3	3	3	3	3	3	3	3	3	75.62	3
The academic standards are about right in terms of rigor	3	3	3	3	3	3	3	3	3	3	3	3	79.85	3
I am satisfied with the number of courses offered as electives	1	1	1	1	2	3	1	1	1	1	1	1	81.61	3

COURSE															
Does the Curriculum meet the present day requirements of industry	3	3	3	3	3	3	3	3	3	3	3	3	3	76.64	3
Do you recommend the curriculum to continue without change?	2	2	2	2	2	2	2	2	2	2	2	2	2	67.01	3
The seminars are stimulating and broadening and help in improving the overall skills	2	2	2	2	2	1	1	2	1	3	1	3		78.10	3
The project work provided me sufficient experience to work in groups and develop skills in problem solving.	3	3	3	3	3	3	3	3	3	3	3	3	3	83.21	3
ADVISING															
I was comfortable in expressing my ideas to my Proctor											1			88.32	3
The Proctorial system can continue in the existing form								1		1		1		87.74	3
FACULTY															
There were faculty available whose fields of expertise satisfied my academic interests	3	3	3	3	3	3	3	3	3	3	3	3	3	80.58	3
The faculty were enthusiastic about their subject	3	3	3	3	3	3	3	3	3	3	3	3	3	81.46	3
The faculty motivated me to do my best	2	2	2	2	2	2	2	2	2	2	2	2	2	79.42	3
The faculty who taught me were effective teachers	3	3	3	3	3	3	3	3	3	3	3	3	3	80.00	3
I was intellectually challenged by my interactions with faculty	2	2	2	2	2	2	2	2	2	2	2	2	2	77.81	3
LABS															
The laboratories are well equipped and meet the course curriculum	2	2	2	2	2	2	2	2	2	2	2	2	2	80.29	3
The Library meets my expectations	1	1	1	1	1	1	1	1	1	1	1	1	1	80.44	3
<i>Employers Survey</i>	<i>P O 1</i>	<i>P O 2</i>	<i>P O 3</i>	<i>P O 4</i>	<i>P O 5</i>	<i>P O 6</i>	<i>P O 7</i>	<i>P O 8</i>	<i>P O 9</i>	<i>P O 10</i>	<i>P O 11</i>	<i>P O 12</i>	<i>Attai nmen t</i>		
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]	3	3	3	3	3	3	3	3	3	3	3	3	3	88.89	3

Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]	3	3	3	3										91.1 1	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]										3				90.0 0	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]						2	2	3						94.4 4	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]					3									83.3 3	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]									3					84.4 4	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]											3			76.6 7	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]	3	3	3	3	3	3	3	3	3	3	3	3	3	90.0 0	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]												3		88.8 9	3

CCA Activities	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	No of Activi ties	Attain ment
-----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	-----------------------	-----------------------	-----------------------	----------------------------------	------------------------

										0	1	2		
Guest Lectures	2	2	2	2	2			2	2	2		2	12	3
Workshops	2	2	2	2	2			2				3	3	3
Student competitions	3	3	3	3	3	2	2	2	3	2	1	3	6	3
Internships	3	3	3	3	3	3	3	3	3	3	3	3	100	3
Student presentations	2	2	1			1		2	2	3		2	140	3
Theme Based Projects	3	3	3	3	3	3	3	3	3	3	3	3	66	3
MOOC courses	2	2										3	140	3
CRT	1	3								3		3	140	3
ECA Activities	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	No of Activi ties	Attain ment
ECA clubs	2	2			2		1	2	3	3		3	5	3
Entrepreneurship(SW AYAM/ED CELL)								2	3	3	2	3	5	3
NSS(includes Sahay, Street cause and all extension activities)						2	2	2	1	3	1	3	5	3
Sports								3	3	2		3	5	3
Inter institute literary and cultural activities								2	3	3		3	5	3

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12
INDIRECT ATTAINMENT	3	3	3	3	3	3	3	3	3	3	3	3

Table 10.3: PO Attainment for the Graduating Batch – Total Attainment

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
DIRECT ATTAINMENT	2.6 5	2.6 2	2.6 4	2.6 5	2.7 0	2.6 9	2.8 4	2.8 4	2.7 6	2.7 7	2.7 7	2.6 4
INDIRECT ATTAINMENT	3	3	3	3	3	3	3	3	3	3	3	3
TOTAL ATTAINMENT	2.7 2	2.6 9	2.7 1	2.7 2	2.7 6	2.7 5	2.8 8	2.8 7	2.8 1	2.8 1	2.8 2	2.7 1

Table 10.4: PSO Attainment for the Graduating Batch – Direct Attainment

Course Code	Course Name	PSO 1	PSO 2	PSO 3
ES110CS	Computer Programming and Problem solving using C	2.5	2.1	2.5
PC440CS	Computer Architecture		2.7	

PC411CS	Java Lab	3	3	3
PC421CS	Operating System Lab	3	3	3
PC510CS	Database Management Systems	2.6	2.6	
.				
.				
.				
.				
PC520CS	Microprocessors and Interfacing	2.3	2.3	
PC511CS	Database Management Systems Lab	3	3	
PC521CS	Microprocessors and Interfacing Lab	3	3	3
PC531CS	Computer Network Lab	3	3	3
PW519CS	Mini Project	3	3	3
PC610CS	Web Programming & Services	2.9	2.8	2.7
		PSO 1	PSO 2	PSO 3
DIRECT ATTAINMENT		2.70	2.69	2.70

Indirect attainment is carried out through the surveys and program level statistics.

Table 10.5: PSO Attainment for the Graduating Batch –Indirect Attainment

Alumni Survey	PSO 1	PSO 2	PSO 3	Attainment	Attainment Level
The study of basic sciences and core engineering helped you in Analyzing the problems at your workplace/higher studies	3			79.03	3
Are you able to identify and define the requirements for a given problem which is appropriate to its solution?	3			81.30	3
Are you able to design/develop a component/process/algorithm as per the specified requirements at your workplace?	2			79.49	3
Are you able to select and use modern engineering/IT tools at your workplace?		2	3	77.68	3
Are you able to work in a respectful and ethical manner with team members to complete the task?	1		1	87.78	3
Are you able to work effectively as an individual and/or in multidisciplinary teams?			1	86.73	3
Have you taken any certification/short-term courses to enhance your professional career? Have you contributed to publications, patents or scientific knowledge? Give brief information Have you received any Awards/Recognition? Give brief information			3	55.27	3
Parent Survey	PSO 1	PSO 2	PSO 3	Attainment	Attainment

					<i>Level</i>
Are you satisfied with the improvement in the personality of your son/daughter as compared to the time of joining the Institute?			1	77.95	3
There is improvement in the student's communication skills as compared to the time of joining the Institute?	3	3	3	75.90	3
Exit Survey	P S O 1	P S O 2	P S O 3	Attai nme nt	Attai nme nt Level
I am satisfied with the number of courses offered as electives	1	2	3	81.61	3
COURSE					3
Does the Curriculum meet the present day requirements of industry	1	1	1	76.64	3
The seminars are stimulating and broadening and help in improving the overall skills	1	1	2	78.10	3
The project work provided me sufficient experience to work in groups and develop skills in problem solving.	1	1	3	83.21	3
FACULTY					
There were faculty available whose fields of expertise satisfied my academic interests	3	3	3	79.28	3
The faculty were enthusiastic about their subject	3	3	3	78.76	3
The faculty who taught me were effective teachers	3	3	3	79.29	3
I was intellectually challenged by my interactions with faculty	2	2	2	80.35	3
LABS					
The laboratories are well equipped and meet the course curriculum	1	2	1	80.29	3
The Library meets my expectations	1	2	1	80.44	3
Employers Survey	P S O 1	P S O 2	P S O 3	Attai nme nt	Attai nme nt Level
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Job specific skills]	3	3	1	88.89	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Problem solving skills]	3			91.11	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Individual and team work skills]	3		1	90.00	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Modern Tool Usage]		2	3	83.33	3

Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Overall job performance]	2	2	2	90.00	3
Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following? [Approach towards lifelong learning skills]			3	88.89	3

CCA Activities	PS O 1	PS O 2	PS O 3	No of Activitie s	Attainmen t Level
Guest Lectures	3	3		10	3
Workshops	1		2	3	3
Student competitions	2	2		6	3
Internships	2	2	2	80	3
Student presentations	1	1	1	102	3
Theme Based Projects	2	2	2	66	3
MOOC courses	2		2	100	3
CCA Activities	PS O 1	PS O 2	PS O 3	No of Activitie s	Attainmen t Level
CRT	2	2	2	50	3
ECA clubs			1	5	3
Entrepreneurship(SWAYAM/ED CELL)	1			5	3
NSS(includes Sahay, Street cause and all extension activities)			1	5	3
Sports			1	5	3
Inter institute literary and cultural activities			1	5	3
Indirect Attainment	3	3	3		

Table 10.6: PSO Attainment for the Graduating Batch –Total Attainment

	PSO1	PSO2	PSO3
DIRECT ATTAINMENT	2.70	2.69	2.70
INDIRECT ATTAINMENT	3	3	3
TOTAL ATTAINMENT	2.76	2.75	2.76

Appendix

VASAVI COLLEGE OF ENGINEERING

(Autonomous)

Ibrahimbagh, Hyderabad – 500031

DEPARTMENT OF _____

ALUMNI SURVEY

We are keen to hear from you. Please spend a moment and respond to this survey. This survey is important to the department as it facilitates the improvement of the programmes offered by the department based on your feedback. The Future students will get benefited from your valuable feedback. Please take some time to respond to this survey.

Personal Information

Name		Organization/Company details	
Year of Graduation		Designation	
Mobile Number		Nature of Work	
Email ID		Past Experience, if any	
Residential Address		Are you an Entrepreneur? If "Yes" specify the company name and address	

Use (√), for giving your consent for the following questionnaire.

S. No	Questionnaire	Details
1	Have you pursued higher education? If "yes" please specify the following	
a.	What is your master's degree that you pursued? (M.S / M.Tech. / MBA / Any other)	
b.	Enter your Scores (GRE, TOEFL, IELTS, CAT/XAT, GATE, GMAT)	
c.	Name & Place of the University and Year of Admission	
2	Have you taken any certification/short-term courses to enhance your professional career? If "Yes" please specify the name/s	

a.	Have you contributed to publications, patents or scientific knowledge? If "Yes", give brief information	
3	Have you received any Awards/Recognition? If "Yes", give brief information	

S. No	Questionnaire	Strongly Agree	Agree	Disagree
1	The study of basic sciences and core engineering helped you in analyzing the problems at your workplace/higher studies			
2	Are you able to identify and define the requirements for a given problem which is appropriate to its solution?			
3	Are you able to design/develop a component/process/algorithm as per the specified requirements at your workplace?			
4	Are you able to conduct investigations to solve complex engineering problems?			
5	Are you able to select and use modern engineering/IT tools at your workplace?			
6	Are you able to take contextual decisions in your professional engineering practice by considering societal and cultural issues?			
7	Are you able to apply the knowledge of societal/environmental contexts, while arriving at a professional engineering solutions?			
8	Are you able to work in a respectful and ethical manner with team members to complete the task?			
9	Are you able to work effectively as an individual and/or in multidisciplinary teams?			
10	Are you able to comprehend and communicate effectively using appropriate verbal communication and documentation skills?			
11	Are you able to handle the projects/allocated works as an individual, also as a member in a team by applying engineering and management principles?			
12	Suggestions, if any, for the betterment of your department			

2.	
3.	

13. Areas in which you will be interested to associate with the college (Pl. tick mark)

- a. I Can take sessions in _____(Specify technical, industry orientation, soft skills etc.)
- b. I can deliver Career guidance sessions for higher education.
- c. I can connect our college to any organization interested to provide internship, projects and placements to our students including referrals.
- d. I can institute awards for meritorious students.
- e. Any other areas. Please specify.

Date:
Place:

SIGNATURE



VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad– 500031

EMPLOYER SATISFACTION SURVEY FORM

Thank you for taking time to fill out this questionnaire. All the information will be kept confidential and will be used for statistical purposes. The survey is intended to assist Vasavi College of Engineering (VCE) for preparing students for the work environment and will better serve your company and industry needs. If we can be of assistance or if you have any questions, please call 040-23146003.

Company/Organization name :	
Name & Designation of person filling form:	
Address:	
City/state/zip code:	
VCE Graduate/Employee name:	
VCE Graduate/Employee Designation:	
VCE Graduate Year and Month of Joining:	
Is the graduate still employed by your company? (YES/NO)	

Please check the table which best indicates your level of satisfaction demonstrated by VCE Graduate performance for each of the following?

Criteria	Excellent	Good	Meets Expectation
Job specific skills			
Problem solving skills			
Individual and team work skills			
Human Values & Professional Ethical values			
Modern Tool Usage			
Verbal and written capabilities			
Leadership skills			
Overall job performance			
Approach towards lifelong learning skills			

Any additional technical skillsets required, please mention.

--

Thank you for your assistance in helping VCE for strengthening the programme.

SIGNATURE

VASAVI COLLEGE OF ENGINEERING (Autonomous)

Ibrahimbagh, Hyderabad – 500031

DEPARTMENT OF _____

PARENTS' FEEDBACK

We request you to assist us by answering a few questions listed below in connection with our services to your ward studying in our Institute.

This feedback would be valuable to us in improving our teaching processes to serve the needs of our students better.

Name of the Parent: _____

Designation: _____

Name of the Student: _____

Year of Study: _____

Mobile No: _____

Email ID: _____

QUESTIONNAIRE		Strongly Agree	Agree	Disagree
1	Are you satisfied with the performance of your son/daughter?			
2	As you satisfied with the improvement in the personality of son/daughter as compared to the time of joining the Institute?			
3	There is improvement in the student's communication skills as compared to the time of joining the Institute?			
4	How well did we do in transforming the student into a good and responsible citizen?			
5	The effectiveness in teaching learning process meets expectations of my son/daughter			

6	The Facilities like Transportation / Library / Canteen / Sports / Drinking water / sanitization meet expectation			
7	Extra and co-curricular activities are good			
8	Laboratory/Computing facilities meet our expectation			
9	The Counselling/ Mentoring system adopted in the department is good			
10	The Training and placement activities planned in the department meet our expectations			
11	The ability of your ward to cope with the needs of the curriculum has improved			
12	My level of satisfaction with the institution is high looking as the way my son/daughter is settled			
13	Will you recommend this department to others?			

Any other information for the improvement of the institute:_____

Name:

Date:

Signature



VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

DEPARTMENT OF _____

Student Exit Survey-YYYY

B.E (_____) VIII-Semester – MON YYYY

Student Particulars:

1. Name :
2. Roll Number :
3. Year of Admission :
4. Address for Correspondence :
5. E-mail id :
6. Mobile Number :
7. Academic Percentage till :
IV Year I-Semester
8. Name of the Mentor :
9. Placement Particulars
No. of Job offers received
Name of the Company/ies :
CTC/Pay Package :
10. Details about Higher Studies
(as applicable)
GATE Score :
GRE Score :
TOEFEL Score :
IELTS Score :
CAT Score :
Names of University (ies) where :
admission secured
11. Preferred choice : Placement / Higher Studies/Entrepreneurship

Dear Student:

Wish you a bright future ahead. Your feedback is very valuable to us for bringing changes in the contents of the Program. Please share your honest opinion on the parameters listed below and affix a tick (✓) mark to the questionnaire below

1.	Program	Strongly Agree	Agree	Disagree
	The Program Outcomes (PO) are widely publicized.			
	The POs need modification to meet the student aspirations.			
	Satisfied with the number of courses offered as professional electives			
	Satisfied with the open elective system and the courses offered herein.			
2.	Course Curriculum			
	The Curriculum meets the present-day industry requirements			
	The curriculum may continue without any change.			
	The seminars are stimulating as they help broaden our views on topics and further improve our skillset			
	The project work provided me with sufficient experience to work in groups and develop skills in problem solving.			
3.	Academic Advising & Mentoring			
	The Mentoring system for students was clearly explained to me			
	My Mentor was always accessible to me			
	My Mentor was sufficiently familiar with the Program and Curricula to guide me			
	I was comfortable expressing my ideas to my Mentor			
	The Mentoring system can continue in the existing form			
4.	Faculty			
	There were faculty available whose fields of expertise satisfied my academic interests			
	The faculty were enthusiastic about their subject			

	The faculty motivated me to do my best			
	The faculty who taught me were effective teachers			
	I was intellectually challenged by my interactions with Faculty			
5.	Resources			
	The laboratories are well equipped and meet the requirements of the course curriculum			
	The class rooms are well ventilated and are also equipped with facilities for learning			
	The Library meets my expectations in terms of latest books and journals and the timings too are flexible			
	The sports facilities are adequate			
	The Canteen premises are neat & tidy and the quality of food served is good			
	5.6 Adequate opportunities are provided for participation in co-curricular and extra curricular activities			
	The services offered by the Bank are good and the Bank Staff are cooperative			
	The health care services provided by the in-house Health Centre are good and adequate.			
	The bus transport facility is good in terms of punctuality and service			
	The cooperative stores have the availability of all the desired stationery items and the rates are reasonable.			
6.	Programme Outcome			
	I will be able to apply engineering knowledge and concepts learnt in the Program to solve problems			
	I will be able to analyze engineering problems.			
	I will be able to design and develop engineering systems based on the inputs obtained from the Program.			
	I will be able to conduct investigations of complex engineering, analyze, interpret the data.			
	I am confident of using the modern tools for solving engineering problems.			

The program has instilled a sense of global/societal responsibility and knowledge on the societal, legal and cultural issues related to engineering.			
The Program provides an understanding of the impact of engineering on environment and design the systems that provide sustainable development.			
The Program has provided an understanding of professional and ethical responsibility.			
I am confident of working effectively as an individual, as a team and a leader working with diverse teams.			
I can communicate effectively on engineering problems, write effective reports, draft documents and make presentations.			
I am confident in using knowledge and understanding of engineering principles in project management, finance and work in multidisciplinary environments.			
I am confident of being engaged in independent & life-long learning throughout my professional life.			

Any other comments or observations:

Overall Grading of the Program:

- o Excellent
- o Very Good
- o Good
- o Satisfactory
- o Unsatisfactory

Signature of Student