CRITERION 7	Continuous Improvement	50

7.1. Actions taken based on the results of the evaluation of each of the POs & PSOs (20)

Identify the areas of weaknesses in the program based on the analysis of evaluation of POs & PSOs attainment levels. Measures identified and implemented to improve POs & PSOs attainment levels for the assessment years.

Under the **2018 scheme curriculum of VTU**, the department has established **60% of the maximum PO attainment value (3) as the minimum target for both PO and PSO attainment**.

Each PO and PSO begins with a **target level of 1.8**, and upon successful attainment, the target increases by **0.1 for each subsequent achievement**. This progressive approach ensures continual improvement in learning outcomes and program effectiveness. The following Table gives the PO & PSO attainment for 3 batches.

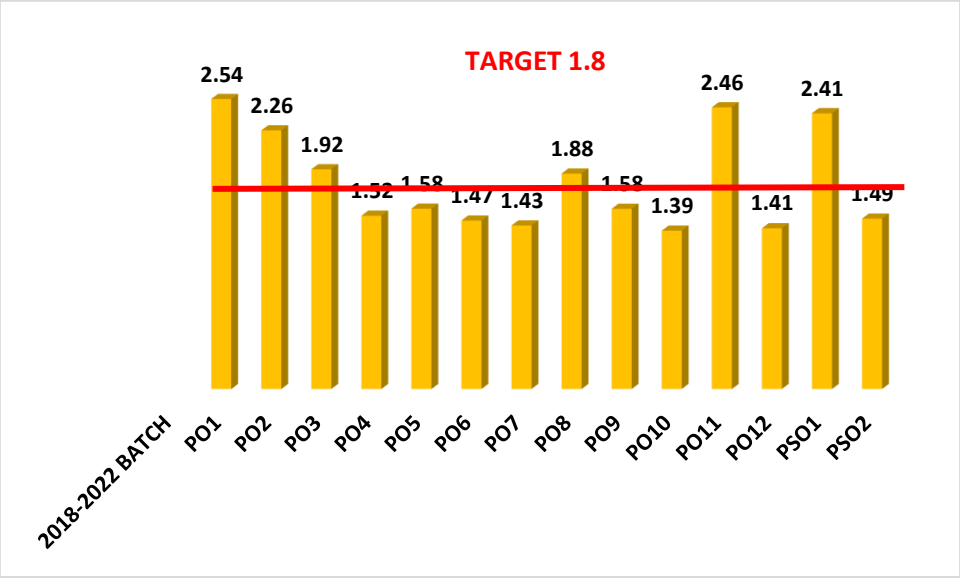


Figure 7.1 1 POs & PSOs attainment for 2018-2022 batch

Figure 7.1 1 POs & PSOs attainment for 2018-2022 batch

Table 7.1.1-7.1.6 separate document

TARGET LEVEL=60% x 3= 1.8

Table 7.1.1 POs - Attainment Levels and Actions for improvement (2021-22) batch

POs	Target Level	Attainment Level	Observation
PO1	***Engineering knowledge:*** *Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.*		
	1.8	**2.54**	Target is attained. Set a higher target for the next academic year.
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.*		
	1.8	**2.26**	Target is attained. Set a higher target for the next academic year.
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.*		
	1.8	**1.92**	Target is attained. Set a higher target for the next academic year.
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.*		
	1.8	**1.52**	Target is not attained
• Action Plan 1: Students should be encouraged to attend ideathons and workshops so that they are exposed to intricate real-world issues and come up with viable solutions. • Action Plan 2: Encourage students to work on research-oriented projects of social significance.			
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.*		
	1.8	**1.58**	Target is not attained
• Action Plan 1: Workshops and hands-on sessions should be organized, so that students will learn new tools. • Action Plan 2: Should motivate students to attend MOOC/NPTEL/ Skill development courses related to the usage of modern tools.			
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*		
	1.8	**1.47**	Target is not attained

<table>
<tr><td colspan="4">• Action Plan 1: Students should be encouraged to identify the issues in the field of health, safety, legal, social and cultural, and should be motivated to consider those issues in their academic projects.
• Action Plan 2: Students should be encouraged to participate in social clubs like NSS, Rotaract.</td></tr>
<tr><td rowspan="2">PO7</td><td colspan="3">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.</td></tr>
<tr><td>1.8</td><td>1.43</td><td>Target is not attained</td></tr>
<tr><td colspan="4">• Action Plan 1: Field trips can be organized to expose students to existing sustainability solutions like rain water harvesting, organic farming, etc.</td></tr>
<tr><td rowspan="2">PO8</td><td colspan="3">Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</td></tr>
<tr><td>1.8</td><td>1.88</td><td>Target is attained. Set a higher target for the next academic year.</td></tr>
<tr><td rowspan="2">PO9</td><td colspan="3">Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.</td></tr>
<tr><td>1.8</td><td>1.58</td><td>Target is not attained</td></tr>
<tr><td colspan="4">• Action Plan 1: Should be encouraged to participate in conferences/seminars/workshops.
• Action Plan 2: Should be encouraged to participate in various extra-curricular activities in other colleges and Promotion of various clubs and activities</td></tr>
<tr><td rowspan="2">PO10</td><td colspan="3">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.</td></tr>
<tr><td>1.8</td><td>1.39</td><td>Target is not attained</td></tr>
<tr><td colspan="4">• Action Plan 1: Students are encouraged to take up presentations and seminars on their areas of interest.
• Action Plan 2: Soft skills training to be imparted to the students to enhance communication skills.</td></tr>
<tr><td rowspan="2">PO11</td><td colspan="3">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.</td></tr>
<tr><td>1.8</td><td>2.46</td><td>Target is attained. Set a higher target for the next academic year.</td></tr>
<tr><td rowspan="2">PO12</td><td colspan="3">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.</td></tr>
<tr><td>1.8</td><td>1.41</td><td>Target is not attained</td></tr>
<tr><td colspan="4">• Action Plan 1: Awareness to be created for students about MOOCs/NPTEL/Skill development courses encouraging them to enroll on courses online and continue their learning in their area of interest.</td></tr>
</table>

Table 7.1.2 PSOs - Attainment Levels and Actions for improvement (2021-22)

PSOs	Target Level	Attainment Level	Observation
PSO1	***PSO1:*** *Ability to apply the concept of mechanical engineering to design a system, a component or a process/system to address a real-world challenges*		
	1.8	***2.41***	Target is attained. Set a higher target for the next academic year.
PSO2	***PSO2:*** *Ability to develop effective communication, team work, entrepreneurial and computational skills*		
	1.8	**1.49**	Target is not attained
• Action Plan 1: Students should be encouraged to take up presentations, seminars on their area of interest in technical seminars, conferences & symposiums etc., • Action Plan 2: students should be encouraged to participate in the Project exhibition, industrial visit, workshops etc.,			

Table 7.1.3 POs - Attainment Levels and Actions for improvement (2022-23) batch

POs	Target Level	Attainment Level	Observation
PO1	***Engineering knowledge:*** *Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.*		
	1.9	**2.83**	Target is attained. Set a higher target for the next academic year.
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.*		
	1.9	**2.59**	Target is attained. Set a higher target for the next academic year.
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.*		
	1.9	**2.09**	Target is attained. Set a higher target for the next academic year.

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.*		
	1.8	**1.84**	Target is attained. Set a higher target for the next academic year.
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.*		
	1.8	**1.70**	Target is not attained
• Action Plan 1: Workshops and hands-on sessions should be organized, so that students will learn new tools. • Action Plan 2: Should motivate students to attend MOOC/NPTEL/ Skill development courses related to the usage of modern tools.			
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 .*		
	1.8	**1.64**	Target is not attained
• Action Plan 1: Students should be encouraged to identify the issues in the field of health, safety, legal, social and cultural, and should be motivated to consider those issues in their academic projects. • Action Plan 2: Students should be encouraged to participate in social clubs like NSS, Rotaract.			
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.*		
	1.8	**1.69**	Target is not attained
• Action Plan 1: Field trips can be organized to expose students to existing sustainability solutions like rain water harvesting, organic farming, etc. • Action Plan 2: Motivating students to take up Environment and sustainability-related Projects as their project topic.			
PO8	***Ethics:*** *Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*		
	1.9	**2.07**	Target is attained. Set a higher target for the next academic year.
PO9	***Individual and team work:*** *Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.*		
	1.8	**1.74**	Target is not attained
• Action Plan 1: Should be encouraged to participate in conferences/seminars/workshops. • Action Plan 2: Should be encouraged to participate in various extra-curricular activities in other colleges and Promotion of various clubs and activities			
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.*		

	1.8	**1.56**	Target is not attained
• Action Plan 1: Students are encouraged to take up presentations and seminars on their areas of interest. • Action Plan 2: Soft skills training to be imparted to the students to enhance communication skills.			
PO11	***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.*		
	1.9	**2.51**	Target is attained. Set a higher target for the next academic year.
PO12	***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.*		
	1.8	**1.59**	Target is not attained
• Action Plan 1: Awareness to be created for students about MOOCs/NPTEL/Skill development courses encouraging them to enroll on courses online and continue their learning in their area of interest.			

Table 7.1.4 PSOs - Attainment Levels and Actions for improvement (2022-23)

PSOs	**Target Level**	**Attainment Level**	**Observation**
PSO1	***PSO1:*** *Ability to apply the concept of mechanical engineering to design a system, a component or a process/system to address real-world challenges*		
	1.9	***2.70***	Target is attained. Set a higher target for the next academic year.
PSO2	***PSO2:*** *Ability to develop effective communication, team work, entrepreneurial and computational skills*		
	1.8	**1.66**	Target is not attained
• Action Plan 1: Students should be encouraged to take up presentations, seminars on their area of interest in technical seminars, conferences & symposium etc., • Action Plan 2: students should be encouraged to participate in the Project exhibition, industrial visit, workshops etc.,			

Table 7.1.5 POs - Attainment Levels and Actions for improvement (2023-24) batch

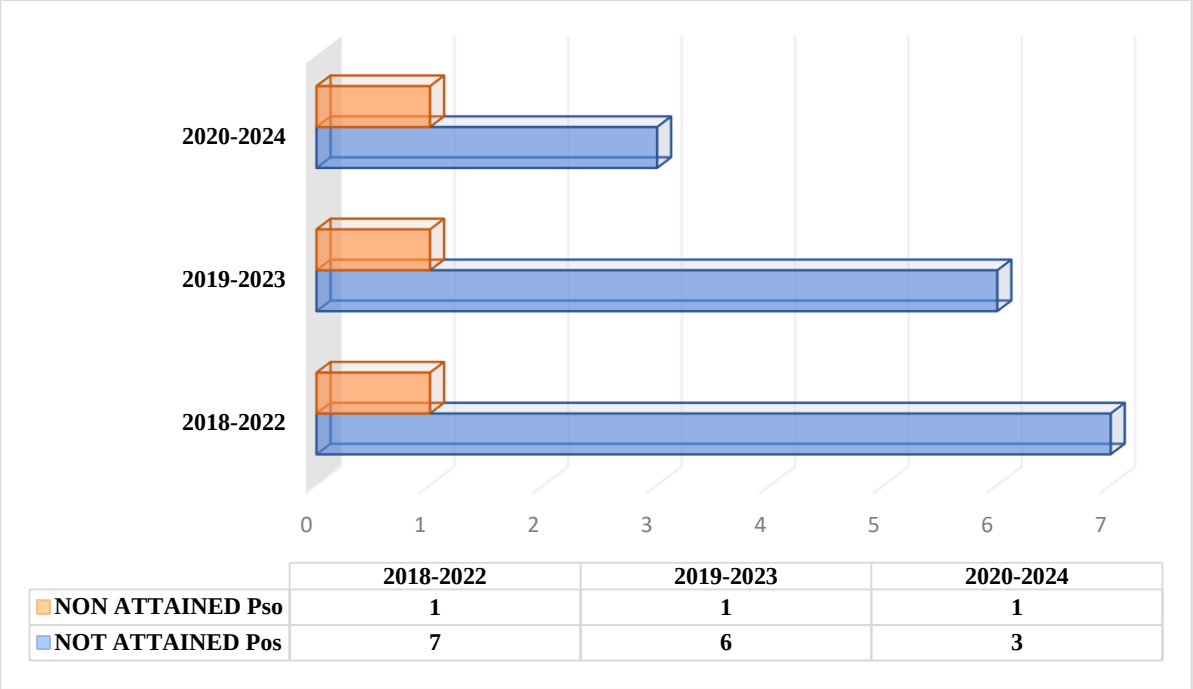
POs	Target Level	Attainment Level	Observation
PO1	***Engineering knowledge:*** *Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.*		
	2.0	**2.80**	Target is attained. Set a higher target for the next academic year.
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.*		
	2.0	**2.57**	Target is attained. Set a higher target for the next academic year.
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.*		
	2.0	**2.08**	Target is attained. Set a higher target for the next academic year.
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.*		
	1.9	**1.93**	Target is attained. Set a higher target for the next academic year.
PO5	***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.*		
	1.8	**1.84**	Target is attained. Set a higher target for the next academic year.
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*		
	1.8	**1.64**	Target is not attained
• Action Plan 1: Students should be encouraged to identify the issues in the field of health, safety, legal, social and cultural, and should be motivated to consider those issues in their academic projects. • Action Plan 2: Students should be encouraged to participate in social clubs like NSS, Rotaract.			
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.*		
	1.8	**1.75**	Target is not attained

• Action Plan 1: Field trips can be organized to expose students to existing sustainability solutions like rain water harvesting, organic farming, etc. • Action Plan 2: Motivating students to take up Environment and sustainability-related Projects as their project topic.			
PO8	***Ethics:*** *Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*		
	2	**2.16**	Target is attained. Set a higher target for the next academic year.
PO9	***Individual and team work:*** *Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.*		
	1.8	**2.15**	Target is attained. Set a higher target for the next academic year.
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.*		
	1.8	**2.11**	Target is attained. Set a higher target for the next academic year.
PO11	***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.*		
	2.0	**2.48**	Target is attained. Set a higher target for the next academic year.
PO12	***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.*		
	1.8	**1.71**	Target is not attained
• Action Plan 1: Awareness to be created for students about MOOCs/NPTEL/Skill development courses encouraging them to enroll on courses online and continue their learning in their area of interest.			

Table 7.1.6 PSOs - Attainment Levels and Actions for improvement (2023-24)

PSOs	**Target Level**	**Attainment Level**	**Observation**
PSO1	***PSO1:*** *Ability to apply concept of mechanical engineering to design a system, a component or a process/system to address a real-world challenges*		
	2.0	***2.76***	Target is attained. Set a higher target for the next academic year.
PSO2	***PSO2:*** *Ability to develop effective communication, team work, entrepreneurial and computational skills*		
	1.8	**1.78**	Target is not attained

- Action Plan 1: Students should be encouraged to take up presentations, seminars on their area of interest in technical seminars, conferences & symposiums etc.,
- Action Plan 2: students should be encouraged to participate in the Project exhibition, industrial visit, workshops etc.,



	2018-2022	2019-2023	2020-2024
NON ATTAINED Pso	1	1	1
NOT ATTAINED Pos	7	6	3

Figure 7.1.2 Improvement in PO-PSO Attainment