



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING

(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,
 NAAC Accredited with 'B++' grade, Accredited by NBA, Certified by ISO 9001:2015)
 L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

Programme Assessment Committee (PAC)

ATR on POs and PSOs Attainments of 2015-19 Batch

A.Y: 2019-20

POs	Target Level	Attainment Level	Observations
PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.			
	69	70	<p align="center">Target reached</p> <p>Out of 72 courses, only 66 courses are contributing to this PO1. Out of 66, 34 courses including basic science courses, core courses, internships, Comprehensive Viva-Voce and labs are the courses above average PO attainment value of 70%. The addition of courses like Total quality management, Innovation and Entrepreneurship, PO1 attainment levels have been enhanced.</p>
<p>Action 1: It is found that 32 courses are lower attainment value than target attainment of PO1. Among the courses, some courses like Engineering physics, Machine Design-1, Industrial Management, Heat Transfer and some of the labs like basic simulation, basic mechanical engineering are least contributing to the attainment of PO1. There is a need to change the teaching-learning methodology for the above courses.</p> <p>Action 2: The courses having less than 69% POs attainment are identified and marked in yellow colour and these details are forwarded to the concerned course coordinators and module coordinators.</p> <p>Action 3: Basic principles of engineering domain as well as the knowledge of mathematics are highly useful for solving complex problems. These things can be improved by proving more tutorials and assignments.</p>			
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.			
	69	71	<p align="center">Target reached</p> <p>Out of 72 courses, 63 courses are contributing to this PO2. Out of 65, 34 courses including labs and miscellaneous courses have reached the above average PO attainment of 69%.</p>

	<p>Action 1: It is found that 31 courses are lower attainment value than target attainment of PO1. Among the courses, Basic simulation lab, Engineering physics, Machine Design-1, Machine Tools and dynamics lab, heat transfer and Production Technology and modeling lab least contributing to the attainment of PO2. It is instructed to the concerned course and module coordinators that the target not reached courses have to look to improve the program outcome by changing the different pedagogical methods.</p> <p>Action 2: The courses having less than 69% are identified and marked in yellow colour and also necessary suggestion are given to the course coordinators to improve the attainments of these courses in future.</p> <p>Action 3: Formulation of problems and its analysis should be done in the class by making discussion with students.</p>		
<p>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.</p>			
	68	69	<p style="text-align: center;">Target reached</p> <p>Out of 72 courses, only 58 courses are contributing to this PO3. Out of 58, only 30 courses including labs and miscellaneous courses have reached the above average PO attainment of 68%. Because of added Renewable Energy Sources, robotics and Total quality management, the target of PO3 could have been reached.</p>
	<p>Action 1: It is instructed to the concerned faculty members that the target not reached courses have once again to take a look to improve the program outcome.</p> <p>Action 2: Certain courses like production Technology, Engineering Physics, Machine Design-1 and heat transfer along with few labs are identified with less than 60% PO attainment levels. It is found that 7 courses are less than 60% PO3 attainment.</p> <p>Action 3: Change the teaching methodology such that higher cognitive level problems especially design orientation like model developments related to mechanical engineering are to be discussed in the class rooms.</p>		
<p>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.</p>			
	69	70	<p style="text-align: center;">Target reached</p> <p>Out of 72 courses, only 45 courses are contributing to this PO4. Out of 45, only 26 courses including labs and miscellaneous courses have reached the above average PO attainment of 69%. This is due to some of the courses like English communication Lab, Engineering chemistry and physics Lab, the PO4 attainment levels have been improved.</p>

<p>Action 1: It is instructed to the concerned course and module coordinators that the target not reached courses have to think for improvement of conduct and investigations of problems especially in labs.</p> <p>Action 2: Some courses are having seriously very low program outcomes which is less than 60% especially heat transfer, Machine Design-1, Machine tools and dynamics lab, production technology and modelling lab, mini project and main project.</p> <p>Action 3: Special care has to be taken to improve the analysis and investigation of problems using ANSYS and software tools.</p>			
<p>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.</p>			
	68	68	<p>Target reached</p> <p>Out of 72 courses, only 35 courses are contributing to this PO5. Out of 35, only 19 courses including labs have reached the target greater than equal to 68%. Courses like Engineering graphics, CP lab, Machine Drawing, Automobile Engineering are contributed majorly for improvement in attainment level of PO5.</p>
<p>Action 1: Prepare some case studies or solve some numerical problems using freely available software tools.</p> <p>Action 2: 7 courses seriously very low program outcomes which are less than 60% especially heat transfer, Machine Design-1, Machine tools and dynamics lab, basic simulation lab and Industrial management. Some video lectures are to be given based on the criticality of the course in software tool usage.</p> <p>Action 3: Improve the teaching –learning methodology to improve the attainment of the identified courses.</p>			
<p>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.</p>			
	70	71	<p>Target reached</p> <p>Out of 72 courses, only 25 courses are contributing to this PO6. Out of 25, only 14 courses including labs are more than 70% average PO attainment.</p> <p>Because of participation of improvement in attending co-curricular and extracurricular activities the PO6 targeted value has been reached.</p>
<p>Action 1: Frequent conducting workshops as a part of course work can develop skills and they try to make some models based on societal issues.</p> <p>Action 2: The some courses like Basic mechanical engineering lab and production technology and main project are identified and marked as yellow in colour which is less than 65%.</p>			

	Action 3: Motivate the students to actively participate in social services and the interaction between industry and society.		
PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
	70	70	<p>Target is reached</p> <p>Out of 72 courses, only 27 courses are contributing to this PO7. Out of 27, only 15 courses including lab courses have reached the above average attainments more than 70%. Some courses like Engineering chemistry, computer programming, Engineering chemistry and physics lab, Machine drawing are contributed positively for meeting the attainment target of PO7.</p>
<p>action 1: more practical oriented projects are to be modeled.</p> <p>action 2: environmental activities like plantation, energy waste heat recovery model developments are initiated.</p> <p>action 3: some courses like production technology, machine tools and metal cutting and thermal engineering lab and main project are identified with less than 60% PO attainment levels and marked as yellow in colour.</p>			
PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
	73	68	<p>Target is not reached</p> <p>Out of 72 courses, only 8 courses are contributing to this PO8. Out of 8, only 3 courses are crossed the average PO attainment of 73%. Professional Ethics and Human Values is the course added to this curriculum, so the gap has filled the earlier PO attainment of R11 regulation.</p>
<p>Action 1: Encouraging more students to participate more on sports and cultural activities.</p> <p>Action 2: While solving the engineering practice oriented problems graduates have to follow the code of ethics.</p> <p>Action 3: Course like internships, mini project and main project are contributed less attainment of PO8. Improve the ethical principles and methodology to improve the attainment of the above identified courses.</p>			
PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
	71	71	<p>Target reached</p> <p>Out of 72 courses, only 15 courses are contributing to this PO9. Out of 15, only 8</p>

			courses including labs have reached the average PO attainment 71%.
	<p>Action 1: Increasing emphasis on seminars/ group discussions and to carry out the lab experiments individually or in some cases as team members.</p> <p>Action 2: Few subjects are having seriously very low program outcomes which are less than 65% attainment of PO9. Basic mechanical Engineering Lab and fluid mechanics and hydraulics machines lab, Various activities like participation of workshops and seminars, AMEL activities caused the improvement in PO9.</p>		
<p>PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.</p>			
	70	71	<p>Target reached</p> <p>Out of 72 courses, only 13 courses are contributing to this PO10. Out of 13, only 6 courses including labs have reached the average PO attainment level equal to 70%. C programming lab Communication and Presentation Skills Laboratory have been added and contributed positively to meeting the target of PO 10.</p>
	<p>Action 1: Change the delivery content like involving the more students in interaction to improve the communication skill of the students</p> <p>Action 2: Some courses like production technology and modelling lab, Seminar, internship and power plant engineering and main project are identified with low program outcomes which are less than 65%. Some corrective measures are given to the respective course coordinators for improving the attainment of these courses.</p>		
<p>PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.</p>			
	70	69	<p>Target is not reached</p> <p>Out of 72 courses, only 9 courses are contributing to this PO11. Out of 9, only 5 courses including labs have reached the target greater than or equal to 70%.</p>
	<p>Action 1: Impart the knowledge and understanding of the engineering and management principles to work out projects on multidisciplinary environments.</p> <p>Action 2: Select internship activities based on to work, as a member and leader in a team. Courses like mini project, seminar and main project attainments are very low when compared to the target attainment of PO11.</p> <p>Action 3: Improve the teaching –learning process for the identified courses.</p>		
<p>PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</p>			
	68	69	Target reached

			<p>Out of 72 courses, 68 courses are contributing to this PO12. Out of 68, 44 courses including labs have reached the target greater than more than average PO attainment equal to 68%.</p> <p>Continuous motivation on higher studies and self learning like MOOCS course on automobile engineering have given the strength to the attainment of this PO12.</p>
<p>Action 1: Encourage/Motivate the students about the importance of engineering courses importance in higher studies</p> <p>Action 2: Inculcate the students to develop the habit of self preparation and life is nothing but learning new information.</p> <p>Action 3: Self learning as well as acquiring communication skills is highly essential for the engineering graduates for successful career.</p>			
<p>PSO 1: To apply the principles of thermal sciences to design and develop various thermal systems.</p>			
	71	69	<p>Target is not reached</p> <p>Out of 72 courses, only 26 courses are contributing to this PSO1. Out of 26, only 12 courses including labs and miscellaneous courses have reached the target greater than equal to average PSO1 attainment level of 71%.</p>
<p>Action 1: Some of the courses like heat transfer, thermal engineering, FM & HM lab, and TE Lab are having very low attainment values of PSO1 is the main reason for not reaching the set target. Improve the teaching methodology as well as providing more assignments related to the thermal system may help in improvement of these courses.</p> <p>Action 2: There is lack of fuel cell development activities and focus some attention on this side is also important.</p> <p>Action 3: Developing of some quality of developing the models on thermal systems is to be improved.</p>			
<p>PSO 2: To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.</p>			
	69	67	<p>Target is not reached</p> <p>Out of 72 courses, only 24 courses are contributing to this PSO2. Out of 24, only 11 courses including labs have reached the average PSO2 attainment than equal to 69%. The courses like production technology, production technology and modeling lab,</p>

			Industrial management and machine tools and dynamics lab are seriously causing the lower attainments for not reaching the target of PSO2.
			<p>Action 1: Provide some videos as well as power point presentations for improving the teaching learning process for the above identified courses to improve its attainment level.</p> <p>Action 2: Apply tribological procedures for finding the microstructures of wear and tear of machinery components.</p> <p>Action 3: Provide some industrial tours related to the production industries to improve the practical upstanding level of the identified courses as well as arrange some industrial guest lecture from the industry experts.</p>
			PSO 3: To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.
	69	68	<p style="text-align: center;">Target is not reached</p> <p>Out of 72 courses, only 25 courses are contributing to this PSO3. Out of 25, only 9 courses including labs and miscellaneous subjects have reached the target greater than equal to 69%.</p>
			<p>Action 1: Instructing the design faculty members for conducting the design oriented project works relating to transmission of motion and power.</p> <p>Action 2: Provide more assignments and conduct tutorial classes to the identified courses whose attainment of PSO3 is low. Conduct design contests and competitions for the students regularly.</p> <p>Action 3: Change the teaching methodology such that higher cognitive level problems especially design orientation like model developments related to mechanical engineering are to be discussed in the class rooms.</p>

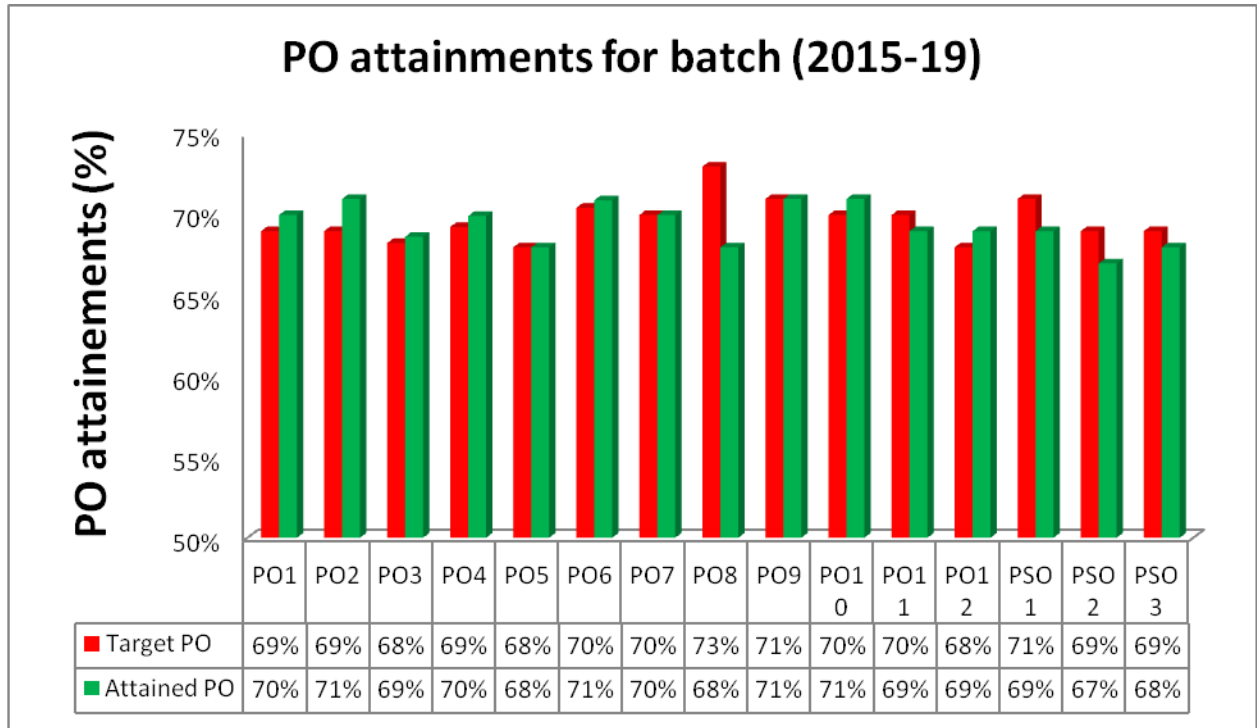


Figure 1: Representation of attainment levels of Program Outcomes (POs) and Program Specific Outcomes (PSOs) for the batch (2015-19)

PAC Signatures

HOD