

17	17EC04	Digital Electronic Circuits	63	62	61									62
18	17EC60	Electrical Circuits and Networks Lab	70	70	70	70	70			77	77	77		77
19	17EC61	Electronic Devices and Circuits Lab	70	71	71	70	71			88	88	88		88
20	17EC62	Analog and Digital Electronic Circuits Lab	73	74	75	74	74			92	92	92		92
21	17EE01	Electronic Circuits and Devices	54				54							58
22	17EE50	Basic Electrical and Electronics Engineering	66	66			70							68
23	17EE52	Basic Electrical Engineering	73	73			74							74
24	17EE60	Electronic Circuits and Devices Lab	70		66		70			70	70	70	70	70
25	17EE71	Basic Electrical Engineering Lab	67			67	69				67	67		67
26	17EE72	Basic Electrical and Electronics Engineering Lab	62	63		62					62	62		62
27	17EI01	Material Science and Engineering	64	61	61	68								
28	17FE01	Professional Communications - I		72		73		72			73	73		73
29	17FE02	Professional Communications - II		64		64		64			64	64		64
30	17FE04	Differential Equations and Linear Algebra	70	70		68								70
31	17FE05	Differential Equations and	79	79		78								79

		Numerical Applications											
32	17FE06	Transformation Techniques and Vector Calculus	57	57		57							57
33	17FE12	Applied Physics	71	71	71	71							71
34	17FE13	Engineering Physics	70	70	70	70							70
35	17FE14	Applied Chemistry	61	61	60			61	61				61
36	17FE15	Engineering Chemistry	63	62	66			62	65				63
37	17FE60	English Communication Skills Lab				85					85	85	85
38	17FE62	Applied Physics Lab	68	68	68	68					68		68
39	17FE63	Engineering Physics Lab	68	68	68	68					68		68
40	17FE64	Applied Chemistry Lab	75	75	75	75		75	75	92	92	92	81
41	17FE65	Engineering Chemistry Lab	74	74	74	73		74	74	87	87	87	79
42	17ME01	Engineering Graphics	58	58	58		58	58			58	58	58
43	17ME02	Engineering Mechanics	49		49								49
44	17ME50	Basic Engineering Mechanics	64	66	66				62			66	66
45	17ME51	Thermal and Hydro Prime Movers	48	47	47	47	49	45					47
46	17ME60	Engineering Workshop	68		68	68	68	68			68		68
47	17ME61	Engineering Mechanics and Fuel Testing Lab									66	66	66
48	17ME62	Computer Aided Engineering Graphics Lab	65				68	77					68

49	17ME75	Computer Aided Engineering Drawing Lab	69					69	69						69
50	17ME76	Thermal and Hydro Prime Movers Lab	69	66	69	68		66							
		AVERAGE	65	65	65	70	68	64	64	82	75	75	70	67	
		Target	69	69	69	72	68	75	75	73	72	71	67	70	

PO Attainment Levels and Actions for improvement: A.Y. (2019 – 20)

The contribution of PO attainments to all POs from all first year courses are analysed and compared with target levels and the actions taken correspondingly are tabulated in table 8.5.2. However overall attainments of POs depend on all the remaining courses of study in the specific UG program.

POs	Target (%)	Attainment (%)	Observations
PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.			
PO1	Target (%)	Attainment (%)	Observations – Target not reached
	69	65	Application of engineering knowledge in some of the courses are not reached. Probable observations made on this PO1 are out of the 46 courses contributing to PO1, 20 courses reached the target, 17 theory and 9 laboratory courses attainment values are less than the target value. The target is not reached due to the low attainment values of the courses like Building Materials and Construction, Applied Mechanics, Surveying, Engineering Mechanics, Engineering Graphics, Thermal and Hydro Prime Movers.
<p>Action 1: The faculty handling the above courses are instructed to improve the Course outcomes by changing the delivery methods.</p> <p>Action 2: Students are encouraged to join in NPTEL courses related to applications of basic science in engineering.</p> <p>Action 3: Bridge course has been conducted for the first year students to bridge the gap between the knowledge and application of basic sciences in engineering problems.</p> <p>Action 4: To sustain the level of attainment achieved, varieties of problems in tutorial classes are solved.</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.			

PO2	Target (%)	Attainment (%)	<p>Observations – Target not reached</p> <p>Analysis level and complex engineering problems are difficult to find in most of the courses at the first year level.</p> <p>Out of 50 courses, 39 courses are mapped to this PO2. 17 courses reached the target level. The remaining 22 courses consists of 16 theory and 5 laboratory courses whose values are less than the target.</p> <p>Building Materials and Construction, Applied Mechanics, Engineering Graphics, Thermal and Hydro Prime Movers are the courses whose attainment values are considerably low.</p>
	69	65	
<p>Action 1: Problem analysis skills are observed from the students in a class room and analysis level problems are formulated and circulated to the students.</p> <p>Action 2: Encouraged to develop their attitude in problem solving ability through tutorial classes.</p> <p>Action 3: Unit wise analysis level problems are created and were distributed to the students to solve them and it is verified by the concerned faculty regularly.</p> <p>Action 4: Analysis level skills are observed in tutorial classes and change the delivery methods to improve the skills in this area.</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>			
PO3	Target (%)	Attainment (%)	<p>Observations – Target not reached</p> <p>Design level problems are difficult to find in most of the courses at the first year level.</p> <p>The number of courses mapped to this PO3 are 31 and of these 14 courses reached the target and the remaining 17 courses are just below the line. Engineering Mechanics, Thermal and Hydro Prime Movers are few courses whose attainment values are noticeably less than the remaining courses.</p>
	69	65	
<p>Action 1: Since more number of courses couldn't meet the target, that courses which have much influence on non-attainment should be checked for the teaching methods. Faculty were instructed to check with their teaching methodology.</p> <p>Action 2: Encouraged in Induction programs and workshops in various mechanical Engineering activities related to design and development of solutions in order to reach higher attainment level</p> <p>Action 3: Necessary steps have been taken by the departments to give more design oriented problems and case studies to the students to solve them manually and also using soft computing techniques.</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>			

PO4	Target (%)	Attainment (%)	Observations – Target not reached The probable observations are comparisons, interpretation of data and conclusions type of items couldn't reach the target in few courses. PO4 is mapped with 29 courses out of which 10 courses reached the target comfortably. The target not reached courses constitute 10 theory and 9 laboratory courses. The laboratory courses miss the target narrowly. Of the theory courses, Transformation Techniques, Thermal and Hydro Prime Movers courses attainments are very less when compared with the other theory courses.
	72	70	
<p>Action 1: New courses were introduced in the first year curriculum like Python Programming, Simulation tools lab, Mathematical tools lab for CSE, IT students to make them tailor ready for applying this knowledge in research, design of experiments and so on.</p> <p>Action 2: For Electrical and Mechanical related courses the knowledge of MATLAB is necessary. It should be imparted by conducting Seminar/Workshop on this topic so that they can have basic idea of designing of experiments, Analysis and interpretation of data.</p> <p>Action 3: Students were given chance to attend the soft computing training classes in the institute laboratories.</p> <p>Action 4: The attainment level can be increased by motivating the students to attend seminars, workshop, symposium, conferences in order to gain the knowledge in investigation of complex engineering problems.</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.			
PO5	Target (%)	Attainment (%)	Observations – Target reached Coding skills are reached marginally. The total courses mapped with this PO5 are 18 courses and only 3 theory and 1 laboratory courses attainment values are slightly less. The courses which didn't reach the target are Electronic Devices and Circuits, Engineering Graphics, Thermal and Hydro Prime Movers and Computer Based Engineering Drawing Lab.
	68	68	
<p>Action 1: Three day workshop was conducted on PCB Design for this batch students from 01-03-2021 and 03-03-2021. The main purpose is to expose students to usage of modern tool in the design and development of Electronic Systems. The link to the details is given by https://www.lbrce.ac.in/ece/ece_events/events_organized_for_students/2020-21/4.Report%20on%20Three%20day%20hands%20on%20traing%20program%20on%20PCB%20Design.pdf</p> <p>Action 2: New courses were introduced in the first year curriculum like Python Programming, Simulation tools lab, Mathematical tools lab to create awareness and interest among the students in Modern tool usage.</p>			

	Action 3: Seminar/Workshop should be conducted on modern tool usage like MATLAB for first year students.		
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.			
PO6	Target (%)	Attainment (%)	Observations – Target not reached Engineering students were trained to help the society through NSS/NCC, Swachh Bharat Abhiyaan activities. 13 courses are mapped with PO6 and only 2 courses reached the target. 8 theory 3 laboratory courses couldn't meet the considerably high target. The noticeably low target values are for Thermal and Hydro Prime Movers, Engineering Workshop, Engineering Graphics, Applied Chemistry, Engineering Chemistry, Professional Communication and Building Materials and Construction courses.
	75	64	
<p>Action 1: A zero credit course Engineer and Society is being introduced in the first year itself in R20 regulation to make students aware of the responsibilities relevant to the professional Engineering practice.</p> <p>Action 2: Conducted orientation program to create awareness about safety aspects in engineering side for the student.</p> <p>Action 3: Conducted Social Service activities as part of NSS and expert sessions on duties and responsibilities of engineers in the society.</p>			
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.			
PO7	Target (%)	Attainment (%)	Observations – Target not reached Environment and Sustainable engineering practices were included in the curriculum which enabled the students to learn more about the Environment and sustainability PO7 is mapped with only 6 courses and the target not reached courses constitute 4 theory courses. Engineering Chemistry, Applied Chemistry, Basic Engineering Mechanics, Building Materials and Construction attainment values are noticeably less when compared with the target.
	75	64	
<p>Action 1: Prakruthi, the Environmental Club organizes events related to Environment. Student coordinators are involved in Azola farming and Milky Mushroom farming to make them think apart from curriculum and make them aware of sustainable development.</p> <p>Action 2: National Webinar on “World Ozone day with a theme Ozone for Life-35 Years of Ozone Layer Protection” was organized by Freshman Engineering Department in association with Prakruthi club of LBRCE and CEED (Centre for Environmental Education) on 16th September, 2020. The seminar intended to make engineering students</p>			

<p>aware of the impact of engineering solutions in the environmental context.</p> <p>Action 3: Centre for Environmental Education and Development (CEED), INDIA organized a National Webinar on “ Food Resources for Sustainable Development” in Collaboration with Department of Environmental Sciences, Acharya Nagarjuna University and PRAKRUTHI The Environmental Club of LakireddyBalireddy College of Engineering, Mylavaram on 16 th October, 2020. It is organised to make the students aware of Engineering Solutions for Sustainable development.</p> <p>Action 4: Many more activities are conducted related to Environment and sustainability details of which can be found in the website https://mail.google.com/mail/u/0/#inbox/FMfcgxwLtZxtqPHPbwFdHvgWFsjxZNfl?projector=1&messagePartId=0.2</p> <p>Action 5: More number of first year and second year students should be encouraged to participate in these activities.</p>			
<p>PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</p>			
PO8	Target (%)	Attainment (%)	<p>Observations – Target reached</p> <p>Instructions were given to the students regarding the professional ethics to be followed in the laboratory sessions. However the attainment in the theory courses like; Basic electronics engineering, computer programming fall short of set target.</p> <p>Total 10 courses are mapped with PO8. Of those 9 courses reached the target comfortably and the only course Electronic Circuits and Devices lab missed the target very narrowly.</p>
	73	82	
<p>Action 1: Ethical and human values are highlighted at the time of induction program for the first year students.</p> <p>Action 2: Recommended for Do’s and Don’ts were distributed through handouts.</p> <p>Action 3: Students were trained in ethical principles & responsibilities in order to attain higher attainment level.</p> <p>Action 4: Students are given code of conducts like usage of data hand books, standard engineering practices to be followed in the examination and academic activities</p>			
<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.</p>			
PO9	Target (%)	Attainment (%)	<p>Observations – Target reached</p> <p>Laboratory classes were conducted by making the class strength into groups based on the number of experiments available.</p> <p>Of the 21 courses mapped with PO9, only 11 courses reached the target. 3 theory courses like Professional Communication II, Engineering Workshop, and Engineering Graphics missed the target. Though the 7 laboratory courses attainment values are less, the difference is not much noticeable and can be ignored.</p>
	72	75	
<p>Action 1: Different activities were conducted by clubs like Robotics club, Literary club, Environmental club, etc.</p>			

	<p>Action 2: Group and Individual activities were conducted for first year students by various professional student chapters, Spoorthi, the literary club, NSS unit which aids students in functioning effectively as a member or leader in different fields in the future.</p> <p>Action 3: Participation of more number of first year students should be encouraged by departments which makes them confident in group as well as individual activities.</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>			
PO10	Target (%)	Attainment (%)	<p>Observations – Target reached</p> <p>Students were given training on communication and soft skills.</p> <p>Though the PO10 target is reached comfortably, only 12 courses out of 20 reached the target. Professional Communication II, Computer Based Engineering Drawing Lab, BEE lab, BEEE lab, Engineering Graphics are few courses whose attainment is away from the target.</p>
	71	75	
<p>Action 1: Classes on communication and soft skills, analytical aptitude, and technical skills are arranged by the college every year apart from regular classes as per schedule.</p> <p>Action 2: Group discussion / Role play/ Debate/ Quiz/Essay Writing /Elocution competitions are encouraged at regular intervals.</p> <p>Action 3: Spoorthi, the literary club, NSS unit of LBRCE conducted different events to enhance the communication skills.</p> <p>Action 4: First year students are encouraged to participate more in these activities.</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>			
PO11	Target (%)	Attainment (%)	<p>Observations – Target reached</p> <p>Understanding and demonstrating management principles and applying to own works enable students to get exposed to Project management.</p> <p>Very few courses are mapping with this PO11.</p>
	67	70	
<p>Action 1: Importance of project management and finance issues related to the project work in terms of workshops to be conducted.</p> <p>Action 2: Motivated to work as a team in multidisciplinary environments.</p> <p>Action 3: In technical events like LAKSHYA students were encouraged as Coordinators in finance related activities.</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>			
PO12	Target (%)	Attainment(%)	<p>Observations – Target not reached</p> <p>The students were made aware of the need, to prepare and to engage in independent and lifelong learning in various engineering streams</p> <p>PO12 is mapped with maximum number of courses. 46</p>
	70	67	

			<p>courses are mapped and only 19 courses could reach the target. The remaining courses like Thermal and Hydro Prime Movers, Engineering Mechanics, Transformation Techniques and Vector Calculus, ECD, EDC, ECN, Building Material and Construction, Applied Mechanics, Surveying are the few courses which are much away from the target.</p>
	<p>Action 1: Guest lecture was organized on SDLC and latest emerging trends in software industry dated 30-07-2020 to update students in latest emerging trends.</p> <p>Action 2: Assignments based on the apply level and analysis level problems are to be discussed in the class room and highlight its importance at the time of their project works</p> <p>Action 3: students are motivated to enrich the knowledge with recent trends in mechanical Engineering and are encouraged to acquire the basic life skill programs.</p>		