LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B.Reddy Nagar, Mylavaram – 521 230, N.T.R. District, Andhra Pradesh, India
Affiliated to JNTUK, Kakinada & Approved by AICTE New Delhi
Accredited by NAAC with 'A' grade, An ISO 9001:2015 Certified Institution
DEPARTMENT OF AEROSPACE ENGINEERING
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RECOMMENDATIONS/SUGGESTIONS REPORT

PO/PSO ATTAINMENTS **Batch: 2018-2022** **A.Y: 2021-22**

<table>
<tr><th>POs</th><th>Target Level (%)</th><th>Attainment Level (%)</th><th>Observations</th></tr>
<tr><td colspan="4">PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.</td></tr>
<tr><td rowspan="2">PO1</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target not reached
Out of 52 courses, 48 courses are contributing towards PO1. Out of 48 courses, 29 courses are above the PO target level.</td></tr>
<tr><td>65</td><td>63</td></tr>
<tr><td></td><td colspan="3">Action 1: The courses with less than 65% of PO attainment are identified. Those courses are Engineering Fluid Mechanics, Strength of Materials, Elements of Aerospace Engineering, Probability and Statistics, Aerodynamics-I, Elements of Heat Transfer, CAD/CAM, Propulsion-II, Aircraft Structures -II, Flight Dynamics, Space Mechanics, Industrial Engineering and Management, Computational Fluid Dynamics, Instrumentation, Measurements and Experiments in Fluids, Introduction to Space Technology, Theory of Vibration, Helicopter Engineering. Out of these courses Strength of Materials, Probability and Statistics, Propulsion-II, Aircraft Structures -II, Space Mechanics and Introduction to Space Technology are the very poor contributors. These details are forwarded to the concerned course instructorss through module coordinators. Necessary improvements are recommended in the teaching-learning methodology for these courses to improve the PO attainment for the forthcoming batches.
Action 2: The knowledge on engineering better imparted through conducting relevant problem-solving sessions, tutorials, and assignments and through display models for those courses.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td rowspan="2">PO2</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target not reached
Out of 52 courses, 47 courses are contributing towards PO2. Out of 47 courses, 27 courses are above the PO target.</td></tr>
<tr><td>65</td><td>62</td></tr>
<tr><td></td><td colspan="3">Action 1: The courses with less than 65% of PO attainment are identified. Those courses are Engineering Fluid Mechanics, Strength of Materials, Elements of Aerospace Engineering, Environmental Science, Probability and Statistics, Thermal Engineering, Aerodynamics-I, Elements of Heat Transfer, CAD/CAM, Propulsion-II, Aircraft Structures -II, Flight Dynamics, Space Mechanics, Industrial Engineering and Management, Computational Fluid Dynamics, Instrumentation, Measurements and Experiments in Fluids, Introduction to Space Technology, Theory of Vibration, Helicopter Engineering. Out of these courses, Strength of Materials,</td></tr>
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<tr><td></td><td colspan="3">Probability and Statistics, Propulsion-II, Aircraft Structures -II, Space Mechanics are identified as the very poor contributors of the PO2.
Action 2: The integration of case studies, literature studies, and problem-solving workshops in the above courses might significantly contribute to the development of problem analysis skills. These recommendations have been sent to the corresponding course instructors and module coordinators.
Action 3: Encouraging the students to solve the complex problems might improve the contribution to the PO.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td rowspan="2">PO3</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target reached
Out of 52 courses, 46 courses are contributing towards PO3. Out of 46 courses, 39 courses are above the PO target.</td></tr>
<tr><td>60</td><td>62</td></tr>
<tr><td></td><td colspan="3">Action 1: The courses with less than 65% PO attainment are identified such as Strength of Materials, Environmental Science, Probability and Statistics, Propulsion-II, Aircraft Structures -II, Space Mechanics. Necessary improvements are recommended in the teaching-learning methodology for the above courses to improve the PO attainment for the forthcoming batches.
Action 2: Students are expected to carry out their projects/internships in reputed organizations so that they will involve in the design and development of solutions for the latest issues.
Action 3: The implementation of project-based learning, design thinking workshops, guest lectures, and industry collaborations might significantly enhance students' design skills in Aerospace Engineering courses. Further, students might demonstrate their ability to develop solutions for complex engineering problems that meet specified needs while considering public health and safety, as well as cultural, societal, and environmental factors. The practical application of design principles might nurture their capacity to address real-world challenges effectively.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td rowspan="2">PO4</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target reached
Out of 52 courses, 47 courses are contributing towards PO4. Out of 47 courses, 38 courses are above the PO target.</td></tr>
<tr><td>60</td><td>62</td></tr>
<tr><td></td><td colspan="3">Action 1: It is instructed to the concerned course and module coordinators that the target not reached courses must think for improvement of conduct and investigations of problems, especially in labs and problematic courses to improve the attainment level of PO4.
Action 2: Active Involvement of the students into the faculty research activities might improve the ability of students to investigate the complete problems.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td rowspan="2">PO5</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target reached
Out of 52 courses, 14 courses are contributing toward PO5. Out of 14 courses, 13 courses are above the PO target</td></tr>
<tr><td>60</td><td>64</td></tr>
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<tr><td></td><td colspan="3">Action 1: Prepare the assignment questionnaire such that the students must use a computer-based tool to execute the assignment. Hence there might be more positive contribution to this PO.
Action 2: Conduct of industrial based guest lectures on the latest tools those are being used in the industry might improve the contribution of PO.
Action 3: Instructed to watch video lectures and do MOOCs related to tool usage.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td></td><td>Target Level (%)</td><td>Attainment Level (%)</td><td></td></tr>
<tr><td>PO6</td><td>65</td><td>62</td><td>Target not reached
Out of 52 courses, only 06 courses are contributing toward PO6. All courses are above the PO target.</td></tr>
<tr><td></td><td colspan="3">Action 1: All the courses contributing to PO have reached the target. It is instructed to improve the target level for this po subjected to possibilities.
Action 2: The society oriented projects and the community services projects might improve the contribution of the PO.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td rowspan="2">PO7</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target not reached
Out of 52 courses, only 02 course is contributing toward PO7 and is above the target</td></tr>
<tr><td>65</td><td>63</td></tr>
<tr><td></td><td colspan="3">Action 1: Faculty are instructed to teach the responsibilities of engineers towards the environment while developing engineering solutions.
Action 2: Some of the courses might be included in upcoming regulations which might contribute to this PO.
Action 3: Students should be taught the necessity of sustainability in developing the engineering solutions.</td></tr>
<tr><td colspan="4">PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</td></tr>
<tr><td rowspan="2">PO8</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target not reached
Out of 52 courses, only 07 courses are contributing toward PO8. All courses are above the PO target.</td></tr>
<tr><td>65</td><td>62</td></tr>
<tr><td></td><td colspan="3">Action 1: Ethical principles to be taught to the students all the time during the lectures and laboratory sessions.
Action 2: Industry expert talks will be arranged to improve the awareness code of ethics in designing and deploying aircraft components.</td></tr>
<tr><td colspan="4">PO 9: Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings</td></tr>
<tr><td rowspan="2">PO9</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target not reached
Out of 52 courses, 08 courses are contributing toward PO9. All courses are above the PO target.</td></tr>
<tr><td>65</td><td>63</td></tr>
<tr><td></td><td colspan="3">Action 1: Students are encouraged to carry out the curricular (Projects, Seminars, internships, etc.) and co-curricular activities as a team so that they will have the opportunity to work in diverse teams and different roles.</td></tr>
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<tr><td></td><td colspan="3">Action 2: Students are encouraged to conduct and participate in various programs at the college level to get practice in working as a team. These actions must contribute to this PO through indirect assessment.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td rowspan="2">PO10</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target not reached
Out of 52 courses, 07 courses are contributing towards PO10. All courses are above the PO target.</td></tr>
<tr><td>65</td><td>63</td></tr>
<tr><td></td><td colspan="3">Action 1: Change the delivery content like involving more students in interaction/group discussion to improve the communication skill of the students.
Action 2: Soft skill training is imparted to students to enhance various aspects of communication or technical talks through group discussion, presentation, and new learning outcomes.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td rowspan="2">PO11</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target reached
Out of 52 courses, 05 courses are contributing toward PO11. All courses are above the PO target.</td></tr>
<tr><td>60</td><td>60</td></tr>
<tr><td></td><td colspan="3">Action 1: Impart the knowledge and understanding of the engineering and management principles to work out projects in multidisciplinary environments.
Action 2: Select internship activities based on the work, as a member and leader in a team to acquire knowledge of project management principles and finance.
Action 3: Improve the teaching-learning process for the identified courses.
Action 4: Students are encouraged to do multidisciplinary projects.</td></tr>
<tr><td colspan="4">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.</td></tr>
<tr><td rowspan="2">PO12</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target not reached
Out of 52 courses, 50 courses are contributing toward PO12. Out of 50 courses, 31 courses are above the PO target.</td></tr>
<tr><td>65</td><td>60</td></tr>
<tr><td></td><td colspan="3">Action 1: Inculcate the students to develop the habit of self-preparation and self-learning through textbooks, journals, print media, electronic media, NPTEL videos, etc.
Action 2: Faculty are expected to teach the importance of core courses in life-long learning.
Action 3: Association Activities are conducted to develop critical thinking
Self-learning modules through SWAYAM & NPTEL courses are introduced to the students for inculcating the spirit of Continuing education.
Action 4: Department conducts technical training/GATE classes for the graduates to motivate the students towards higher education and lifelong learning.</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td colspan="4">PSO 1: To apply the knowledge of Aerodynamics, Propulsion, Aircraft structures, and Flight Dynamics in Aerospace vehicle design.</td></tr>
<tr><td rowspan="2"></td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Target not reached
Out of 52 courses, 44 courses are contributing towards PSO1. Out of 44 courses, 27 courses are above the PO target value of 65%.</td></tr>
<tr><td>65</td><td>61</td></tr>
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	Action 1: To Improve the teaching methodology as well as provide more assignments related to the courses such as Engineering Fluid Mechanics, Strength of Materials, Elements of Aerospace Engineering, Aerodynamics-I, Elements of Heat Transfer, CAD/CAM, Propulsion-II, Aircraft Structures -II, Flight Dynamics, Space Mechanics, Industrial Engineering and Management, Computational Fluid Dynamics, Instrumentation, Measurements and Experiments in Fluids, Introduction to Space Technology, Theory of Vibration and Helicopter Engineering. Out of the above courses, Strength of Materials, Propulsion-II, Aircraft Structures -II, Space Mechanics, Introduction to Space Technology are the very poor contributors of the PSO1. It is suggested the PAC, and DAC examine the content of the courses which are not reached the target and suggest necessary measures to the MCC. **Action 2:** The updated curriculum may provide students with a solid foundation in the key disciplines necessary for aerospace vehicle design. They will develop a deep understanding of Aerodynamics, Propulsion, Aircraft Structures, and Flight Dynamics and their applications in real-world scenarios. **Action 3:** Design projects and case studies will be integrated into the Aerospace Engineering courses to provide students with hands-on experience in applying their knowledge to aerospace vehicle design. These projects will involve analyzing design requirements, conducting feasibility studies, performing simulations, and optimizing designs based on Aerodynamics, Propulsion, Aircraft Structures, and Flight Dynamics principles. **Action 4:** Advanced simulation and modeling tools will be incorporated. So that the students will have access to industry-standard software and resources to simulate and evaluate the performance of aerospace vehicles.

PSO 2:To prepare the students to work effectively in Aerospace and Allied Engineering organizations.

	Target Level (%)	**Attainment Level (%)**	**Target not reached**
	65	61	Out of 52 courses, 47 courses are contributing towards PSO2. Out of 47 course, 30 courses are above the PO target value of 65%.
	Action 1: Students are encouraged to take the internship in the leading defense development organizations so that they can work and explore defense and space research programs as well as aerospace-related industries. **Action 2:** Enhancement in the following parameters like Industry-Relevant Projects, Use of Simulation and Design Software, Professional Development and Soft Skills: Research and Innovation, Industry Visits and Field Trips, Alumni Engagement and Continuous Curriculum Evaluation and Improvement might improve the PSO 2 Attainment in future.		

Coordinator(s) **Head of the Department**