LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
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Affiliated to JNTUK, Kakinada & Approved by AICTE New Delhi
Accredited by NBA under Tier - I, Accredited by NAAC
An ISO 21001:2018, 500001:2018, 14001:2015 Certified Institution
DEPARTMENT OF AEROSPACE ENGINEERING
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RECOMMENDATIONS/SUGGESTIONS REPORT

PO/PSOATTAINMENTS **Batch: 2021-2025** **A.Y:2025-26**

<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">Attained
Out of 43 courses, 41 courses are contributing towards PO1. Out of 41 courses, 32 courses are above the PO target level.</td></tr>
<tr><td>65</td><td>66</td></tr>
<tr><td></td><td colspan="3">Action 1: Courses with a PO attainment below 65% have been identified, namely: Strength of Materials,Aircraft Structures–I,Finite Element Methods in Engineering,Aircraft Structures–II,Introduction to Computational Fluid Dynamics,Elements of Communication Systems,Elements of Heat Transfer,Space Mechanics, and Linear Control Systems.
These findings have been communicated to the respective course coordinators through the module coordinators. Recommendations for necessary improvements in the teaching–learning process have been provided to enhance PO attainment in upcoming batches.
Action 2: Strengthen problem-solving skills in aerospace-specific courses such as Strength of Materials, Computational Fluid Dynamics, and Aircraft Structures by incorporating rigorous numerical practice and simulation-based learning.
Action 3: Integrate advanced computational tools for aerodynamics and propulsion analysis to reinforce theoretical concepts with practical applications.</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">Attained
Out of 43 courses, 40 courses are contributing towards PO2. Out of 40 courses, 32 courses are above the PO target.</td></tr>
<tr><td>65</td><td>67</td></tr>
<tr><td></td><td colspan="3">Action 1: Courses with a PO attainment below 65% have been identified, including Strength of Materials, Aircraft Structures–I, 20AE12 – Finite Element Methods in Engineering, 20AE10 – Aircraft Structures–II, 20AE17 – Introduction to Computational Fluid Dynamics, 20EC82 – Elements of Communication Systems, 20AE28 – Space Mechanics, and 20EE81 – Linear Control Systems. This information has been communicated to the respective course</td></tr>
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<tr><td></td><td colspan="3">coordinators through the module coordinators, along with recommendations for necessary improvements in the teaching–learning methodology to enhance PO attainment in future batches.
Action 2: Conduct industry-oriented case studies based on real aerospace failures and successful missions to strengthen students' critical thinking skills.
Action 3: Enhance mathematical modelling and experimental validation techniques in aerospace applications by involving students in research-oriented projects.</td></tr>
<tr><td colspan="4">PO3: Design/development of solutions: Design solutions for complex engineering problems and designsystem 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">Attained
Out of 43 courses, 38 courses are contributing towards PO3. Out of 38 courses, 31 courses are above the PO target.</td></tr>
<tr><td>60</td><td>66</td></tr>
<tr><td></td><td colspan="3">Action 1: Courses with a PO attainment below 65%, including Strength of Materials, Aircraft Structures–I, 20AE12 – Finite Element Methods in Engineering, 20AE10 – Aircraft Structures–II, 20AE17 – Introduction to Computational Fluid Dynamics, 20EC82 – Elements of Communication Systems, and 20EE81 – Linear Control Systems, have been identified. These details have been forwarded to the respective course coordinators through the module coordinators, along with recommendations for necessary improvements in the teaching–learning methodology to enhance PO attainment in upcoming batches.
Action 2: Students are encouraged to undertake aerospace design projects such as UAV development, propulsion system design, and composite structural analysis. Additionally, new electives focusing on computational methods for aerospace structural and fluid dynamic analysis may be introduced to strengthen design-oriented learning.
Action 3: Identify new courses or electives that can better contribute to PO attainment. Students are also encouraged to enrol in these recommended courses to enhance their competency and overall attainment levels.</td></tr>
<tr><td colspan="4">PO4: Conduct investigations of complex problems: Use research-based knowledge and researchmethods 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">Attained
Out of 43 courses, 39 courses are contributing towards PO4. Out of 39 courses, 32 courses are above the PO target.</td></tr>
<tr><td>60</td><td>66</td></tr>
<tr><td></td><td colspan="3">Action 1: The course and module coordinators have been instructed to focus on improving the conduct of courses that recorded lower attainment levels, particularly the laboratory components. The courses requiring attention include Strength of Materials, Aircraft Structures–I, 20AE12 – Finite Element Methods in Engineering, 20AE10 – Aircraft Structures–II, 20AE17 – Introduction to Computational Fluid Dynamics, 20EC82 – Elements of Communication Systems, and 20EE81 – Linear Control Systems. Coordinators are advised to implement corrective measures to enhance PO4 attainment in the upcoming batches.
Action 2: Laboratory experiences will be strengthened by incorporating activities such as</td></tr>
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<tr><td></td><td colspan="3">wind tunnel testing, structural load analysis, and propulsion system performance evaluation.
Action 3: Students will be encouraged and supported to participate in national and international aerospace research competitions to develop strong investigative and analytical skills.</td></tr>
<tr><td colspan="4">PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modernengineering 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">Attained
Out of 43 courses, 08 courses are contributing toward PO5. Out of 08 courses, 7 courses are above the PO target</td></tr>
<tr><td>60</td><td>70</td></tr>
<tr><td></td><td colspan="3">Action 1: Develop case studies and numerical problem-solving exercises using freely available software tools such as AutoCAD, CATIA, PRO-E, and ANSYS to encourage students to utilize modern engineering tools in their academic work.
Action 2: Provide structured training sessions for students in industry-standard software, including ANSYS, CATIA, MATLAB, and Open FOAM, to strengthen their proficiency in aerospace engineering applications.
Action 3: Organize hands-on workshops on Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) to enhance students' ability to solve real-world engineering problems effectively.
Action 4: Encourage students to actively engage in learning through video lectures and MOOCs related to modern tool usage, particularly for courses such as Introduction to Computational Fluid Dynamics.</td></tr>
<tr><td colspan="4">PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assesssocietal, 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>65</td><td>Attained
Out of 43 courses, only 04 courses are contributing toward PO6. Out of 04 courses all are above the PO target.</td></tr>
<tr><td></td><td colspan="3">Action 1: Courses with a PO attainment below 65%, such as Elements of Heat Transfer, have been identified. These details have been forwarded to the respective course coordinators through the module coordinators. Recommendations for necessary improvements in the teaching-learning methodology have been made for the aforementioned courses to enhance PO attainment in upcoming batches.
Action 2: Encouraging participation in outreach programs focused on aviation safety, sustainability, and the impact of aerospace engineering on society.
Action 3: Organizing guest lectures on regulatory frameworks such as DGCA, FAA, and EASA compliance for aerospace engineers.</td></tr>
<tr><td colspan="4">PO 7: Environment and sustainability: Understand the impact of the professional engineering</td></tr>
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<tr><td colspan="4">solutions insocietal 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 43 courses, only 03 course is contributing toward PO7 and all are above the target.</td></tr>
<tr><td>65</td><td>63</td></tr>
<tr><td></td><td colspan="3">Action 1: Faculty members are directed to incorporate lessons on engineers' responsibilities towards the environment into their teaching methodologies.
Action 2: Integrating sustainable aviation fuel (SAF) research and green propulsion technologies into the curriculum.
Action 3: Conducting projects focusing on reducing carbon footprints in the aerospace industry.</td></tr>
<tr><td colspan="4">PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms ofthe 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 43 courses, only 02 courses are contributing toward PO8 and all are above the target.</td></tr>
<tr><td>65</td><td>64</td></tr>
<tr><td></td><td colspan="3">Action 1: Organizing seminars on ethical considerations in aircraft design, manufacturing, and maintenance.
Action 2: Conducting workshops on aerospace industry standards and regulations to instill professional responsibility.
Action 3: Arrangements will be made for industry expert talks to heighten awareness of the code of ethics in the design and deployment of aircraft components.</td></tr>
<tr><td colspan="4">PO 9: Individual and team work: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings</td></tr>
<tr><td rowspan="2">PO9</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Attained
Out of 43 courses, 03 courses are contributing toward PO9 and all are above the target.</td></tr>
<tr><td>65</td><td>67</td></tr>
<tr><td></td><td colspan="3">Action 1: Facilitate teamwork-based design projects, such as aircraft configuration studies and propulsion system development, to strengthen students’ collaborative and technical skills.
Action 2: Encourage student participation in global aerospace competitions such as SAE Aero Design and AIAA Design Competitions to promote teamwork, innovation, and practical exposure.</td></tr>
<tr><td colspan="4">PO 10: Communication: Communicate effectively on complex engineering activities with the engineeringcommunity 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">Attained
Out of 43 courses, 03 courses are contributing towards PO10 and all are above the target.</td></tr>
<tr><td>65</td><td>67</td></tr>
<tr><td></td><td colspan="3">Action 1: Modify the delivery of course content by increasing student engagement through interactive sessions and group discussions to enhance communication skills.
Action 2: Conduct training sessions on technical report writing and aerospace-specific</td></tr>
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<tr><td></td><td colspan="3">presentations to improve students' documentation and professional communication abilities.
Action 3: Provide opportunities for students to present their research findings at aerospace conferences and seminars to strengthen their public speaking and technical presentation skills.</td></tr>
<tr><td colspan="4">PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineeringand 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">Attained
Out of 43 courses, 01 courses are contributing toward PO11 and is above the target level.</td></tr>
<tr><td>60</td><td>72</td></tr>
<tr><td></td><td colspan="3">Action 1: Introduce aerospace project management case studies to help students develop skills in cost estimation, resource planning, and effective project execution.
Action 2: Encourage students to select internship opportunities that allow them to work both as team members and as team leaders, enabling them to gain practical insight into project management principles and financial considerations.
Action 3: Promote internships in aerospace organizations to provide students with hands-on exposure to project execution, budgeting processes, and industry-level management practices.</td></tr>
<tr><td colspan="4">PO 12: Life-long learning: Recognize the need for and have the preparation and ability to engage inindependent 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 43 courses, 41 courses are contributing toward PO12. Out of 41 courses, 33 courses are above the PO target.</td></tr>
<tr><td>65</td><td>64</td></tr>
<tr><td></td><td colspan="3">Action 1: Emphasize the importance of self-preparation and self-directed learning by encouraging students to use textbooks, journals, digital resources, and NPTEL videos. Courses requiring additional focus for improving PO attainment include Strength of Materials, Aircraft Structures–I, 20AE12 – Finite Element Methods in Engineering, 20AE10 – Aircraft Structures–II, 20AE17 – Introduction to Computational Fluid Dynamics, 20EC82 – Elements of Communication Systems, 20EE81 – Linear Control Systems, and 20AE28 – Space Mechanics.
Action 2: Faculty members are advised to highlight the importance of core aerospace courses in developing long-term learning habits and strengthening foundational knowledge.
Action 3: Encourage students to participate in online certification courses such as NPTEL, Coursera, and edX, particularly those offering advanced aerospace topics.
Action 4: Conduct GATE and GRE preparation sessions to motivate students to pursue higher studies in aerospace engineering and related fields.</td></tr>
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<tr><td colspan="4">PSO1: To apply the knowledge of Aerodynamics, Propulsion, Aircraft structures, and Flight Dynamics in Aerospace vehicle design.</td></tr>
<tr><td rowspan="2">PSO1</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Attained
Out of 43 courses, 38 courses are contributing towards PSO1. Out of 38 courses, 30 courses are above the PO target value of 65%.</td></tr>
<tr><td>65</td><td>66</td></tr>
<tr><td></td><td colspan="3">Action 1: Enhancing teaching methodologies and increasing the number of assignments in courses such as Strength of Materials, Aircraft Structures–I, 20AE12 – Finite Element Methods in Engineering, 20AE10 – Aircraft Structures–II, 20AE17 – Introduction to Computational Fluid Dynamics, 20EC82 – Elements of Communication Systems, 20EE81 – Linear Control Systems, and 20AE28 – Space Mechanics may contribute to improving PSO1 attainment. It is recommended that the PAC and DAC review the course content of these courses that have not met the target and propose necessary measures to the MCC.
Action 2: Strengthen students' understanding of aerodynamics, propulsion, and structural concepts by incorporating advanced simulation-based learning techniques.
Action 3: Focus on application-oriented problem-solving in core subjects to improve students' comprehension in Aerodynamics, Propulsion, Aircraft Structures, and Flight Dynamics.
Action 4: Encourage hands-on research activities in areas such as wind tunnel testing, composite material evaluation, and propulsion system design to enhance practical learning.</td></tr>
<tr><td colspan="4">PSO2: To prepare the students to work effectively in Aerospace and Allied Engineering organizations.</td></tr>
<tr><td rowspan="2">PSO2</td><td>Target Level (%)</td><td>Attainment Level (%)</td><td rowspan="2">Attained
Out of 43 courses, 33 courses are contributing towards PSO2. Out of 33 course, 26 courses are above the PO target value of 65%.</td></tr>
<tr><td>65</td><td>66</td></tr>
<tr><td></td><td colspan="3">Action 1: Encourage students to pursue internships at leading defense development organizations to gain practical experience and opportunities in aerospace-related industries.
Action 2: Enhancing teaching methodologies and increasing the number of assignments in courses such as Strength of Materials, Aircraft Structures–I, 20AE12 – Finite Element Methods in Engineering, 20AE10 – Aircraft Structures–II, 20AE17 – Introduction to Computational Fluid Dynamics, 20EE81 – Linear Control Systems, and 20AE28 – Space Mechanics may contribute to improving PSO2 attainment. It is recommended that the PAC and DAC review the course content of these courses that have not met the target and propose necessary measures to the MCC.
Action 3: Faculty members should apply diverse pedagogical techniques to promote higher-order thinking and analytical skills through advanced problem-solving in classroom settings.
Action 4: Facilitate industrial visits and collaborations with organizations such as ISRO, DRDO, and HAL to enhance students' practical exposure.
Action 5: Conduct skill development programs in aircraft maintenance, avionics, and space technology applications to strengthen students' industry readiness.</td></tr>
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Program Coordinator(s) **Head of the Department**