CENTER OF EXCELLENECE:

1. Digital Flight Simulation Lab (Aero)

The department of Aeronautical Engineering established Digital Flight Simulation Lab with the following equipment: Flight simulator with all accessories System with internet access Flight simulation lab deals with real time Problems of Flight Data Analytics to create an atmosphere for the students to expose to the real time problems of Flight Data Analytics. Students will acquire the basic knowledge of Pilot training. Flight Simulator is a setup which can be used to create the virtual environment for Training a Pilot. In this lab we have source of flight simulator with live shares.

Industry supported center of excellence:

1. Welding Technology:

The Centre of Excellence in Welding Technology is a state-of-the-art facility dedicated to advanced joining processes critical for aerospace, automotive, and structural applications. The laboratory is equipped with modern welding systems including Tungsten Inert Gas (TIG), Shielded Metal Arc Welding (SMAW), Gas Tungsten Arc Welding (GTAW), and Gas Metal Arc Welding (GMAW). This centre provides hands-on training to students in various welding techniques, joint design, and quality assessment of welded structures.

The outcomes achieved from this centre include successful completion of internships by 16 students, and placement offers received by 11 students from M/s EIS, 10 from M/s IXAR, and 10 from M/s Geecy. The facility directly contributes to PO1 (Engineering Knowledge), PO3 (Design/Development of Solutions), and PO5 (Modern Tool Usage). In terms of Program Specific Outcomes, it strongly supports PSO1 (Aircraft Structures) and PSO2 (Manufacturing Processes) by enabling students to understand and apply welding techniques used in aircraft component fabrication and repair.

2. Non Destructive Testing:

The Centre of Excellence in Non-Destructive Testing (NDT) is a specialized facility focused on quality assurance, failure analysis, and safety assessment of aerospace components without causing any damage. The laboratory is equipped with advanced NDT equipment including Ultrasonic Testing, Radiography Testing, Liquid Penetrate Testing, Magnetic Particle Testing, and VMAG NDT Automation systems. Students are trained to detect surface and subsurface defects, cracks, and irregularities in metallic and composite structures, which is a critical skill in aircraft maintenance and manufacturing. The centre has produced remarkable outcomes, including internships for 16 students, and placement offers from M/s EIS (11 students), M/s IXAR (10

students), and M/s Geecy (10 students). This facility aligns with PO1 (Engineering Knowledge), PO2 (Problem Analysis), and PO4 (Investigation of Complex Problems). Regarding PSOs, it directly supports PSO1 (Aircraft Maintenance) and PSO3 (Quality & Safety) by equipping students with non-destructive evaluation techniques essential for airworthiness certification and maintenance protocols.

4. Research Laboratory - Computational Engineering:

The Centre of Excellence for Computational Engineering is a high-end simulation and modeling laboratory designed to provide students with industry-relevant computational skills. The facility houses 30 high-performance personal computers loaded with licensed professional software including ANSYS (ACP, CFX, CFD, APDL), MATLAB, Hyper Mesh, Solid Works, and Fusion 360. This centre enables students to perform finite element analysis, computational fluid dynamics, thermal analysis, and 3D modeling of aerospace components. The outcomes achieved are significant: 20 major projects have been carried out by students; 10 research papers and 10 patents have been published; 45 students have received certification in Dassault Systems SOLIDWORKS; 29 faculty members have been certified in Fusion 360; two Faculty Development Programs (FDPs) and three student training programs have been organized. The laboratory addresses PO3 (Design/Development of Solutions), PO5 (Modern Tool Usage), and PO12 (Life-long Learning). In terms of PSOs, it strongly supports PSO2 (Design & Simulation) and PSO4 (Computational Analysis) by enabling students to virtually test and validate aerospace designs before physical prototyping, thereby reducing cost and development time.

Centre of Excellence - Advanced Composite Materials

The Centre of Excellence for Advanced Composite Materials is a dedicated research laboratory focused on the characterization, testing, and development of composite and advanced engineering materials. The facility is equipped with specialized instruments including a Bottom Pouring Type Stir Casting Machine, Computerized Universal Testing Machine (UTM), Digital Ultrasonic Flaw Detector, Barcol Hardness Tester, and Muffle Furnace. Students and researchers use this laboratory to fabricate metal matrix composites, test mechanical properties such as tensile strength and hardness, and detect internal flaws in composite structures. The outcomes from this centre include completion of 15 major projects by students, publication of 7 research papers, filing of 5 patents, and organization of one student training program. This laboratory contributes to PO2 (Problem Analysis), PO3 (Design/Development of Solutions), and PO4 (Investigation of Complex Problems). Regarding PSOs, it aligns with PSO1 (Aerospace Materials) and PSO4 (Material Testing) by providing hands-on experience in processing and characterizing lightweight, high-strength materials used in modern aircraft and spacecraft structures.

Project Laboratory (AERO IGNITE):

The Project Laboratory is a dynamic, innovation-driven facility that supports student projects, startup initiatives, and participation in national-level competitions. The

laboratory is equipped with RC kits, battery chargers, comprehensive tool kits, hot air guns, and Dremel kits to facilitate fabrication and prototyping activities. Students actively use this lab to design and fabricate fixed-wing Unmanned Aerial Vehicles (UAVs) and multi-rotor drones for various real-world applications including surveillance, agriculture, and logistics. The achievements of this laboratory are noteworthy: students have exhibited their fabricated UAVs and drones in multiple competitions; This facility directly supports PO3 (Design/Development of Solutions), PO5 (Modern Tool Usage), PO9 (Individual and Team Work), and PO10 (Communication). In terms of PSOs, it maps to PSO2 (Product Development) and PSO3 (Innovation & Entrepreneurship) by providing a platform for students to transform creative ideas into working prototypes, participate in competitive events, and develop entrepreneurial skills.

Outcomes & Achievements:

- Fabricated fixed-wing UAVs and drones for various applications.
- Bagged cash prizes of nearly ₹1.5 Lakhs.

Won prizes in SAE INDIA events:

- Drone Design Challenge (DDC),
- Autonomous Drone Design Challenge (ADDC),
- Bi Cycle Design Challenge (BDC),
- Electric Two-Wheeler Design Challenge (ETWDC).


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