Acharya Institute of Technology

DEPARTMENT OF AERONAUTICAL ENGINEERING

Bengaluru – 560107

Innovations by the Faculty in Teaching and Learning:

Innovative teaching methodologies help faculty to deliver their lectures in a faster and efficient manner thereby allowing the students to keep abreast of technological advancements. In addition, innovative teaching aids also impart rationale thinking and self-sufficient thought process in the mind-sets of students by making them more proactive. Few of the innovative teaching techniques adopted in the department are briefly tabulated below:

Sl No.	Innovations by the Faculty in Teaching and Learning
1	**Learning with exclusive study material prepared for various courses and uploaded in the Alive platform**
2	**Method Implemented in Class Room: Student-Centred Instruction learning**
3	**Multimedia Learning (ICT Class Room)**
4	**E-Learning**
5	**3-D Aircraft Sketching and learning**
6	**Learning by Make and Fly: PAPER PLANE**
7	**Model based teaching and learning practice**
8	**Learning through creative assignments**
9	**Project based learning**
10	**Learning through the Case Studies**
11	**Learning through Educational / Industrial visit**
12	**Peer learning – by alumni students**
13	**Learning through Hands-on-workshop /training/ guest lectures / seminars**

The department always keep our students at centre in the teaching learning process. Our faculties have adopted state of the art teaching pedagogy to broaden the curiosity, creativity, amongst the learners. To keep pace with changing technology and demand of learner all faculties integrated ICT tools and innovative pedagogy in their regular teaching. This enhances the young mind to increase their learning capacity. The goals of innovative practices in the teaching-learning process are to make the students get insight knowledge, skill sets and, in the course, and obtain good grades in the End Semester.

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1.Exclusive study material prepared for various courses and uploaded in the Alive platform:

Acharya's Inhouse Built Online platform: Alive:

alive online platform was developed in 2020 during the pandemic COVID-19 to accommodate the online mode of education. This platform enables the faculty to give lectures by uploading their presentations along with the access to white board during the session. The platform allows the user to login only with the college issued email id's and by opting either of the modes 'Listen' and 'speak' as per their need. Students can avail the Lecture notes and related materials from the platform uploaded by the faculty during the session. The attendance of the students is monitored and gets automatically updated in the ERP. The platform allows and supports web monitored internal assessment and meetings with a capacity of 200 plus participants per class. The in-house platform also permits the moderators (HoD/Principal/Management personnel's) to monitor the classes for the smooth functioning of the system.

Fig 1.1 Home page of Alive platform
https://www.alive.university/

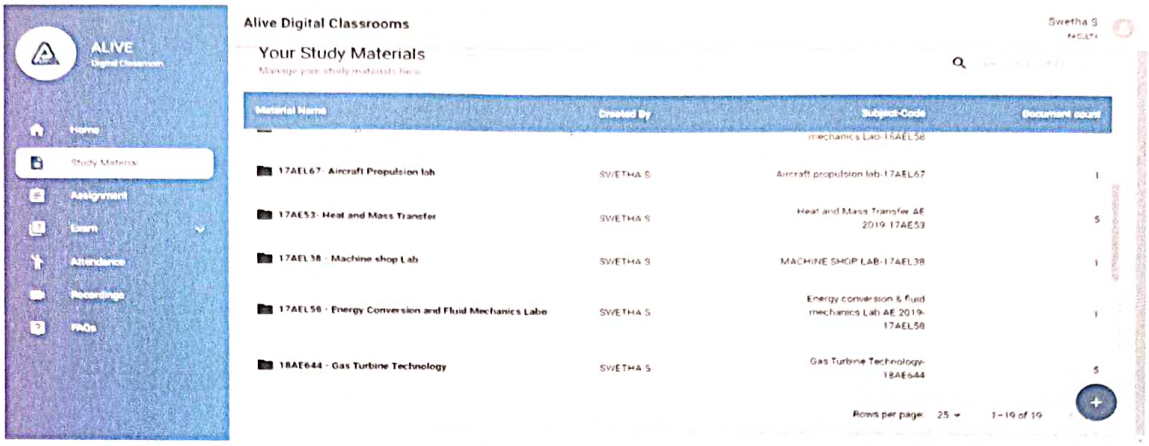

Fig 1.2 Course handling / handled details of a faculty

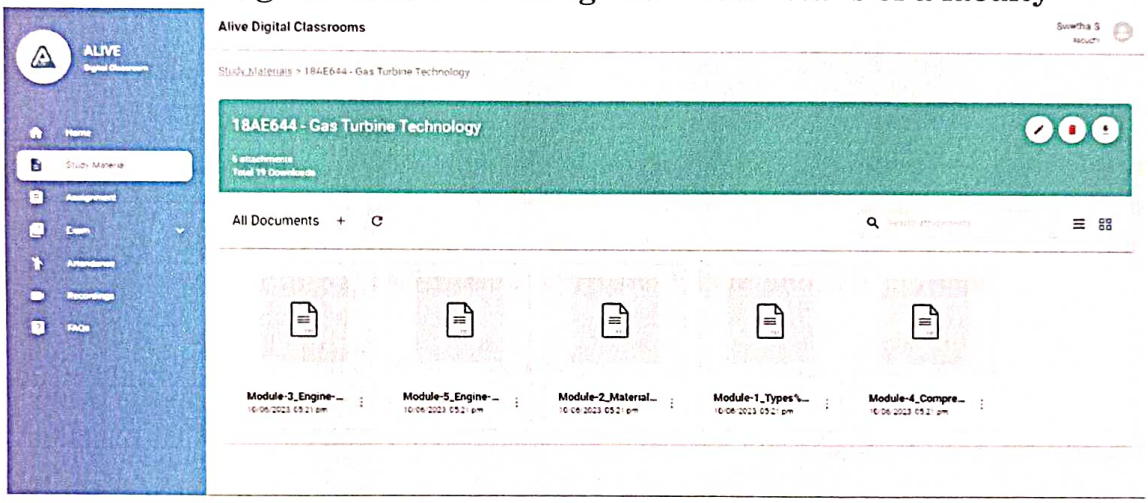

Fig 1.3 All modules of the course notes uploaded in Alive platform

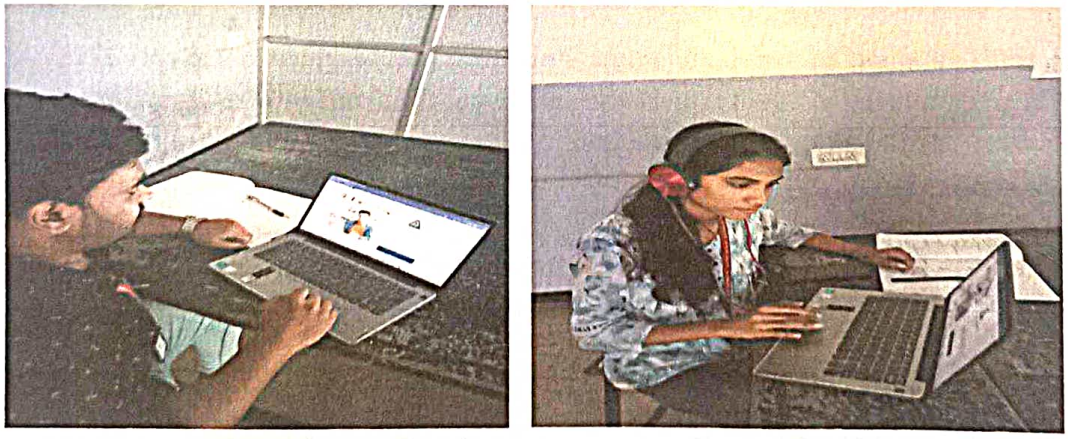

Fig 1.4 a & b Self learning by the student & online class through alive

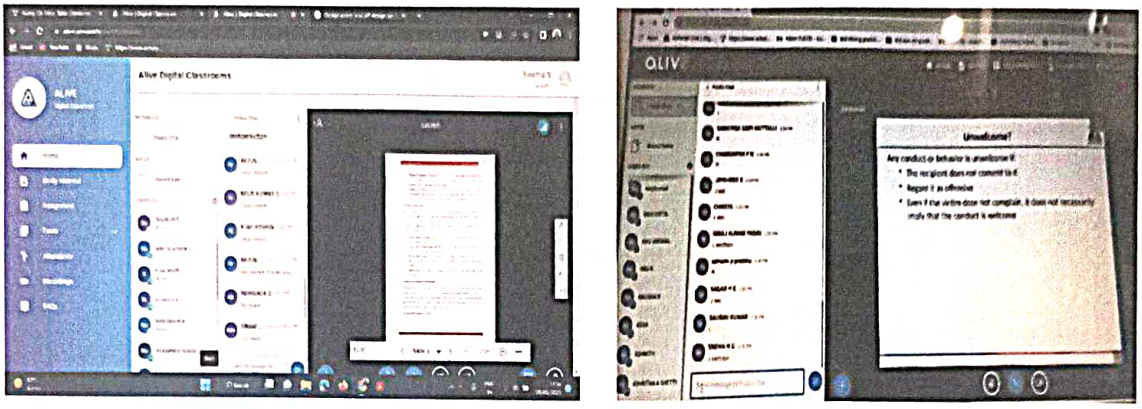

Fig 1.5 a & b Online class through alive

Objectives:

Study materials is to facilitate students' learning, comprehension, and mastery of the subject matter while accommodating their diverse needs and promoting independent learning, Method of garnering information and after processing and retaining it without taking the help of another individual.

Expected Outcomes:

1. Improved understanding: Study materials serve as a valuable resource to enhance students' understanding of the subject matter.
2. Self-paced learning: Study materials allow students to learn at their own pace. They can review the materials repeatedly, focus on challenging areas, and progress through the content at a speed that suits their individual learning needs.
3. self-learning helps a person in understanding the basic concept of learning and it says that everyone has to learn by himself at the end of the day.
4. Get the future of innovations best practice make it done by students self-learning based on their own ideology.
5. Overall, providing study materials to students supports their learning process, enhances understanding, promotes engagement, and fosters self-directed learning. It is an effective way to supplement classroom instruction and help students achieve their academic goals.

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2.Method Implemented in Class Room: Student-Centred Instruction learning:

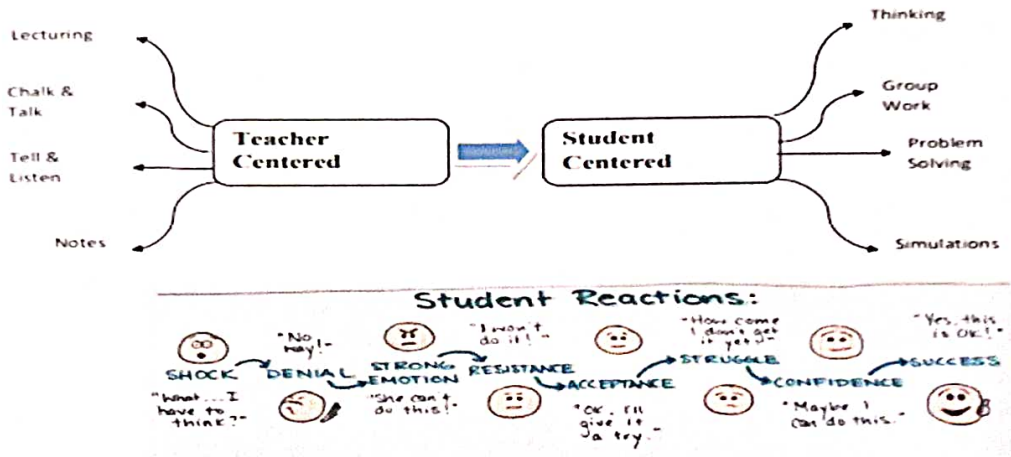
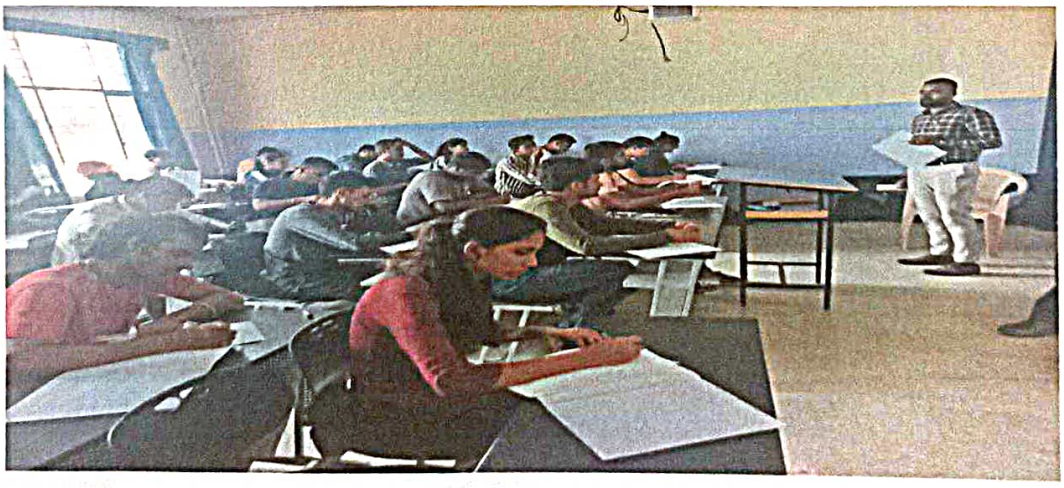


Fig 2.1 Student-Centred class session

Objectives:

The student-centered instruction revolve around empowering students, promoting active engagement, personalization, collaboration, critical thinking, and a lifelong love for learning. This approach recognizes the unique abilities and needs of individual learners and aims to create a supportive and engaging learning environment.



Expected Outcomes:

The student-centered instruction includes improved academic performance, deeper understanding, enhanced problem-solving skills, increased engagement and motivation, improved communication and collaboration skills, development of lifelong learning skills, increased self-confidence, positive attitudes towards learning, and the acquisition of transferable skills. These outcomes contribute to students' overall growth and success in education and beyond.

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3.Multimedia Learning (ICT Class Room):

The course coordinator will deliver some concepts with the aid of Software tools. These learning tools play vital role in delivering subject knowledge. Live demonstration can be an effective tool to present material in classroom and encourage student learning. Multimedia combines basic types of media into learning environment such as text, audio, video and graphics thus providing a powerful tool for teaching.

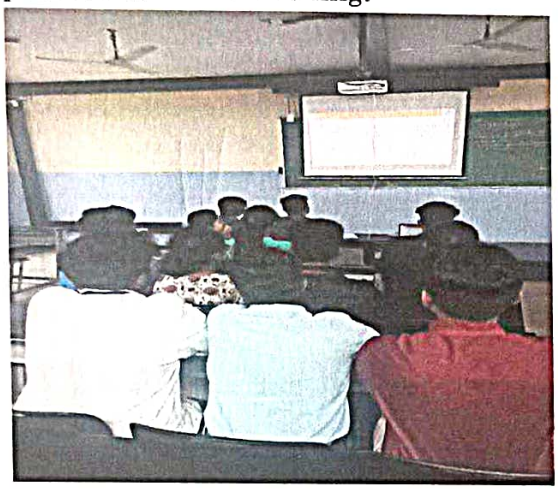

Fig 3.1 a & b ICT tools facilitate interactive session

Prof.Akash explaining the concept of control system using Mat lab & Simulink tool for the course Aircraft Stability & Control class.

Objectives:

To explain some topics in their regular teaching process using Software Tools /Animation / Videos to simplify their presentation.

Expected Outcomes:

The multimedia learning and ICT tools have the potential to increase learner engagement. This engagement can lead to the improved motivation, attention, and overall learning outcomes. Simple way of presenting subject knowledge than from the regular teaching practices and also the student can understand the concepts in a better way.

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4.E-Learning:

E-learning provides access to education and learning opportunities to a wide range of individuals. Students and faculty members are encouraged to register for the NPTEL program / online certification courses of their own areas of research, for enhancing their skills and for understanding the potential concepts much effectively.

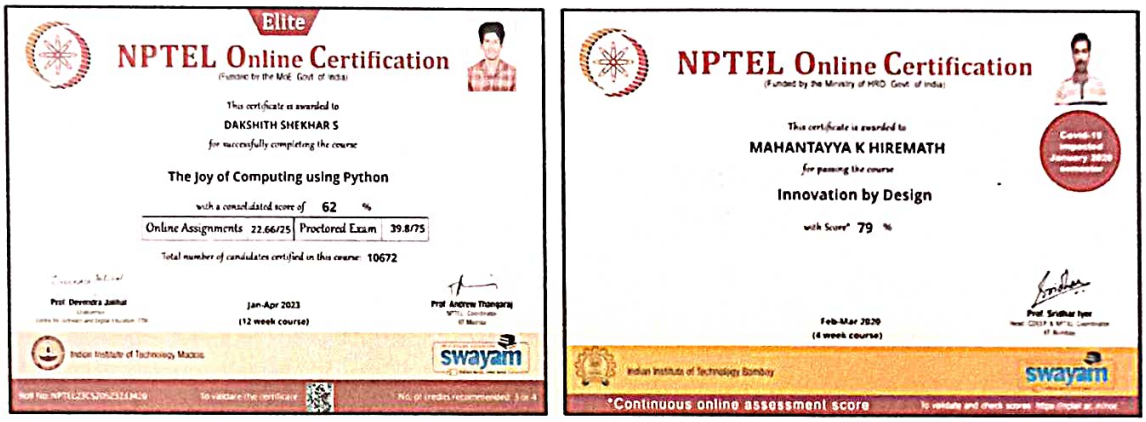

Fig.4.1 a & b NPTEL online certification by student & by faculty

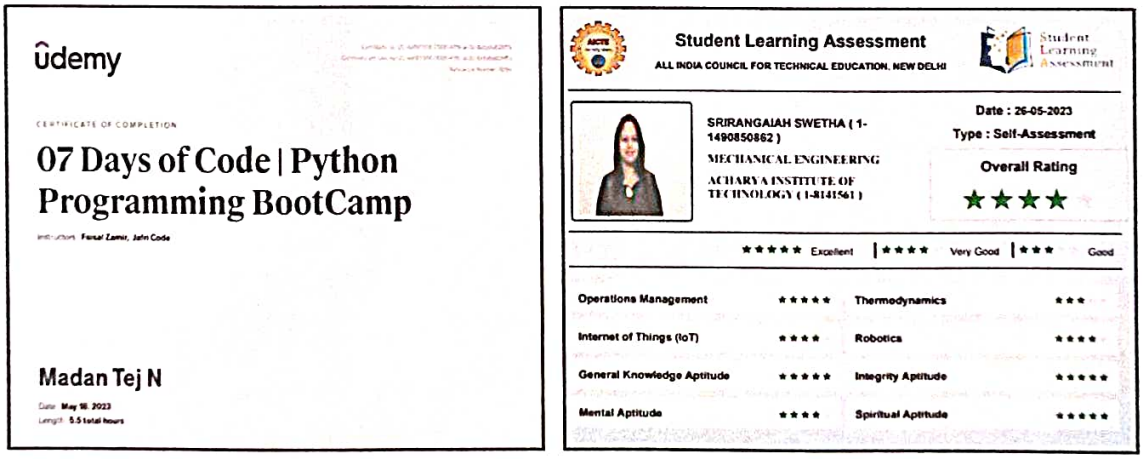

Fig. 4.2 a & b Udemy certification by student & AICTE certification by faculty

Objectives:

The goal of providing high-quality education and training experiences through e-learning, fostering learner engagement, knowledge acquisition, and skill develop ent in a flexible and accessible manner.

Expected Outcomes:

It increases creativity and exploration, efficient problem-solving, design validation, streamlined prototyping, and enhanced learning and education. These outcomes collectively contribute to more successful design processes and better design solutions.

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5.3-D Aircraft Sketching and learning

Fig.5.1 3-D sketches & Students displaying their art with the event coordinator

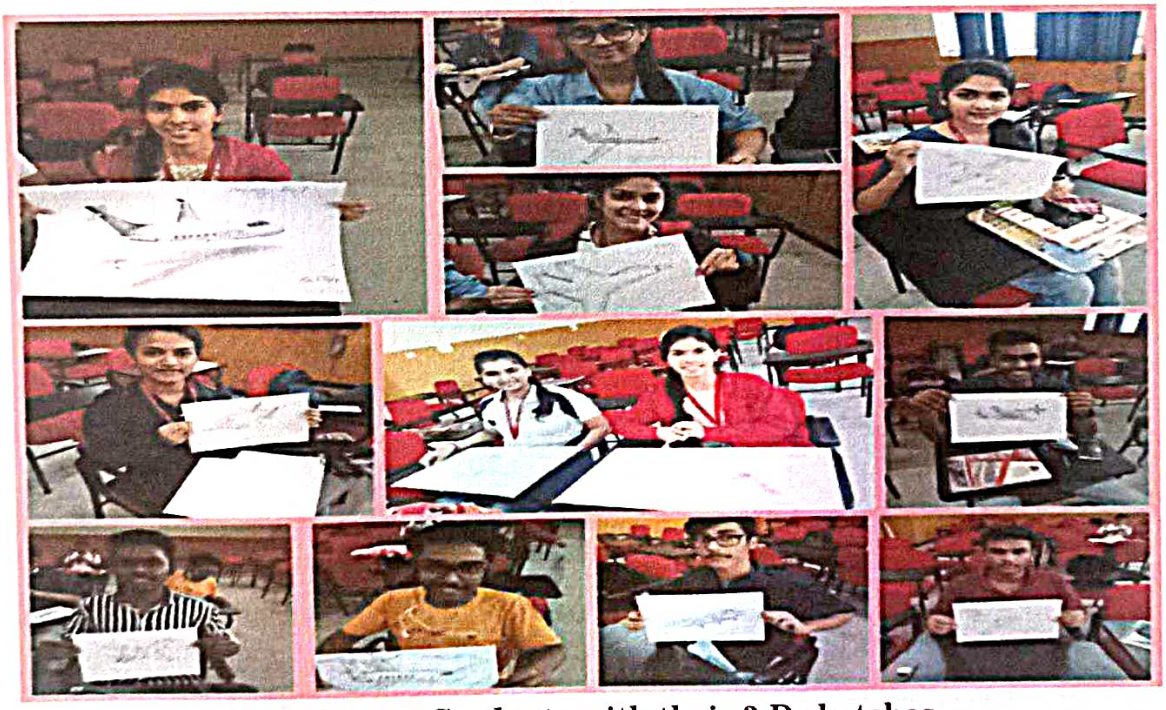

Fig. 5.2 Students with their 3-D sketches

Objectives:

To enhancing visualization, facilitating communication, supporting problem-solving, enabling concept exploration, aiding prototyping, and facilitating training and education in various fields.

Expected Outcomes:

Accessibility, flexibility, personalized learning, cost-effectiveness, diverse learning materials, collaboration and networking, continuous learning, performance tracking, global learning community, and technological proficiency. These outcomes contribute to a dynamic and inclusive learning experience. E-learning facilitates continuous learning and lifelong education by providing access to a vast array of courses and resources.

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6.Learning by Make and Fly: PAPER PLANE

Learning by Make and Fly provides platform for creativity by developing both the academic and technical skills.

Fig. 6.1 a & b Students with the event coordinators & displaying their 'make and fly' model

Objectives:

To encourage students to be inquisitive, independent and to learn and explore and to encourage team work and improve communication proficiency in students.

Expected Outcomes:

Designing and creating unique shapes & configurations and combining creativity, science, skill development, social interaction, and enjoyment into a single activity.

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7.Model based teaching and learning practice

Model-based teaching and learning is a pedagogical approach that incorporates the use of models as central tools in the instructional process.


Fig. 7.1 a & b F-15 model & F- 16 model developed by students


Fig. 7.2 a & b Su 27 model & Rafale Fighter Jet model developed by students


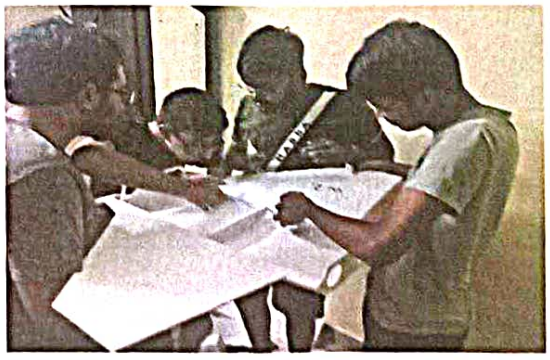

Fig. 7.3 a & b Group of students with their model & model making

Objectives: The model-based teaching and learning are to enhance conceptual understanding, promote inquiry and critical thinking.

Expected outcomes: To improve conceptual understanding, enhanced problem-solving skills, development of scientific and mathematical reasoning, transfer of knowledge, increased engagement and motivation, effective communication and collaboration, metacognitive development, authentic learning experiences, long-term retention, and the cultivation of lifelong learning skill

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8.Learning through creative assignments

Learning through creative assignments is an engaging and effective approach that encourages students to think critically, apply their knowledge, and express themselves creatively.

Fig. 8.1 a & b structural design of plastic straws with load & without load

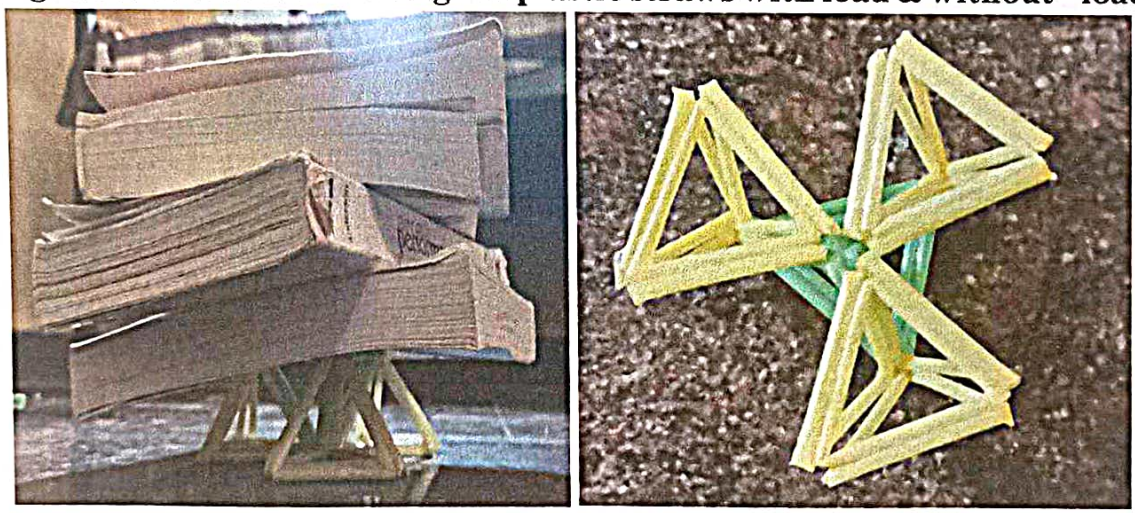

Fig. 8.2 a & b structural design of plastic straws with load & without load

Objective: To build a structure to withstand particular load with any design by using only plastic straw.

Excepted outcomes:

To enhanced critical thinking skills, improved problem-solving abilities, increased engagement and motivation, enhanced communication skills, development of self-expression and individuality, multidisciplinary learning, increased confidence and self-efficacy, collaboration and teamwork skills, cultivation of creativity and innovation, and long-term retention and application of knowledge.

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9.Project based learning

Project-Based Learning is a student-centered instructional approach that involves students engaging in an extended project or investigation to address a complex question, problem, or challenge

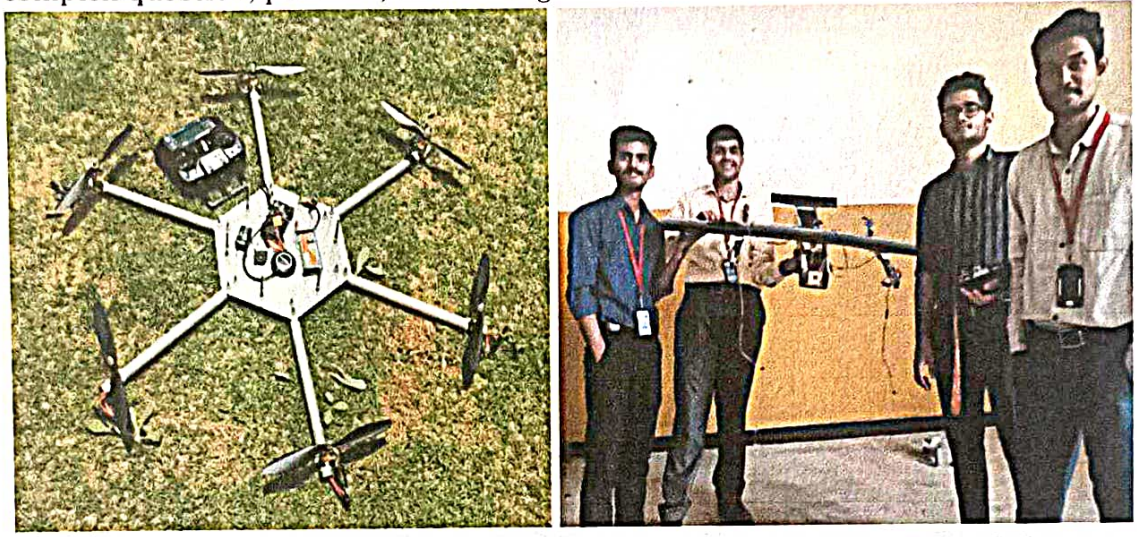

Fig. 9.1 a & b Hexacopter model & fixed wing UAV model

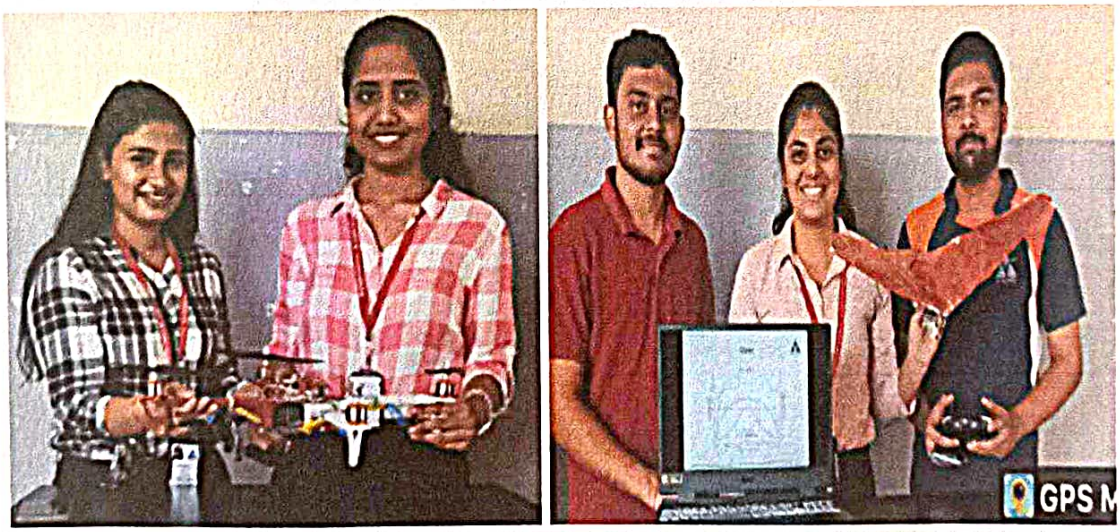

Fig. 9.2 a & b Quadcopter model & flapping wing model

Objectives: To focuses on students engaging in real-world projects to develop knowledge, skills, and competencies.

Expected outcomes:

To increase content knowledge, critical thinking and problem-solving skills, collaboration, self-directed learning skills, creativity and innovation, presentation and communication skills, real-world relevance, and reflection and metacognition. These outcomes support holistic student development and prepare them for success in both academic and real-life contexts.

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10.Learning through the Case Studies

Learning through case studies is a valuable educational approach that involves analyzing real or hypothetical scenarios to gain practical knowledge and insights.

Fig 10.1 Sample reports submitted by students

Objectives: To bridge the gap between theory and practice by providing students with opportunities to apply theoretical concepts, principles, and frameworks to real-world scenarios.

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Expected outcomes:

Able to apply theoretical knowledge to real-world situations, students develop the ability to transfer their learning to practical contexts and also bridge the gap between theory and practice. Also to engage in reflective practice that is critically evaluate their own thinking, assumptions, and learning process. By this student shall identify strengths, weaknesses, and areas for improvement in their analysis and decision-making.

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11.Learning through Educational / Industrial visit

Learning through educational or industrial visits provides unique opportunities for students to gain practical knowledge, observe real-world contexts, and engage with professionals in various fields.

Fig. 11.1 a & b HAL & AFTC visit

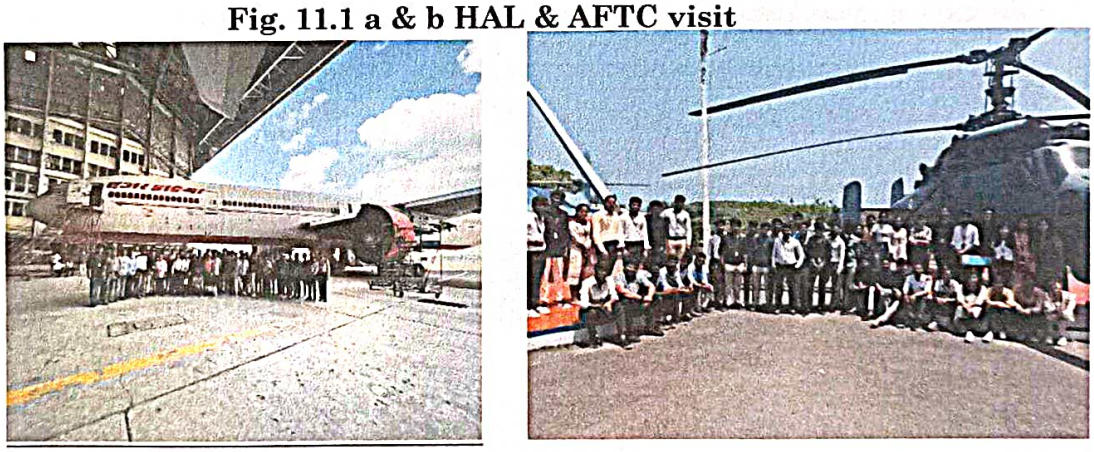

Fig. 11.2 a & b Air India, Mumbai & Naval museum, Goa visit

Objectives:

To provide valuable experiential learning opportunities, practical exposure, experiential learning, contextual understanding, exposure to industry practices, networking opportunities, career exploration, skill development, cultural and social awareness, and motivation and inspiration.

Expected outcomes:

The first-hand experiences that deepen their understanding and knowledge of a specific industry, field, or organization and to witnessing real-world scenarios, students gain insights into the practical applications of their academic knowledge. It also helps students understand how concepts and theories are implemented in actual work settings, making their learning more tangible and relevant.

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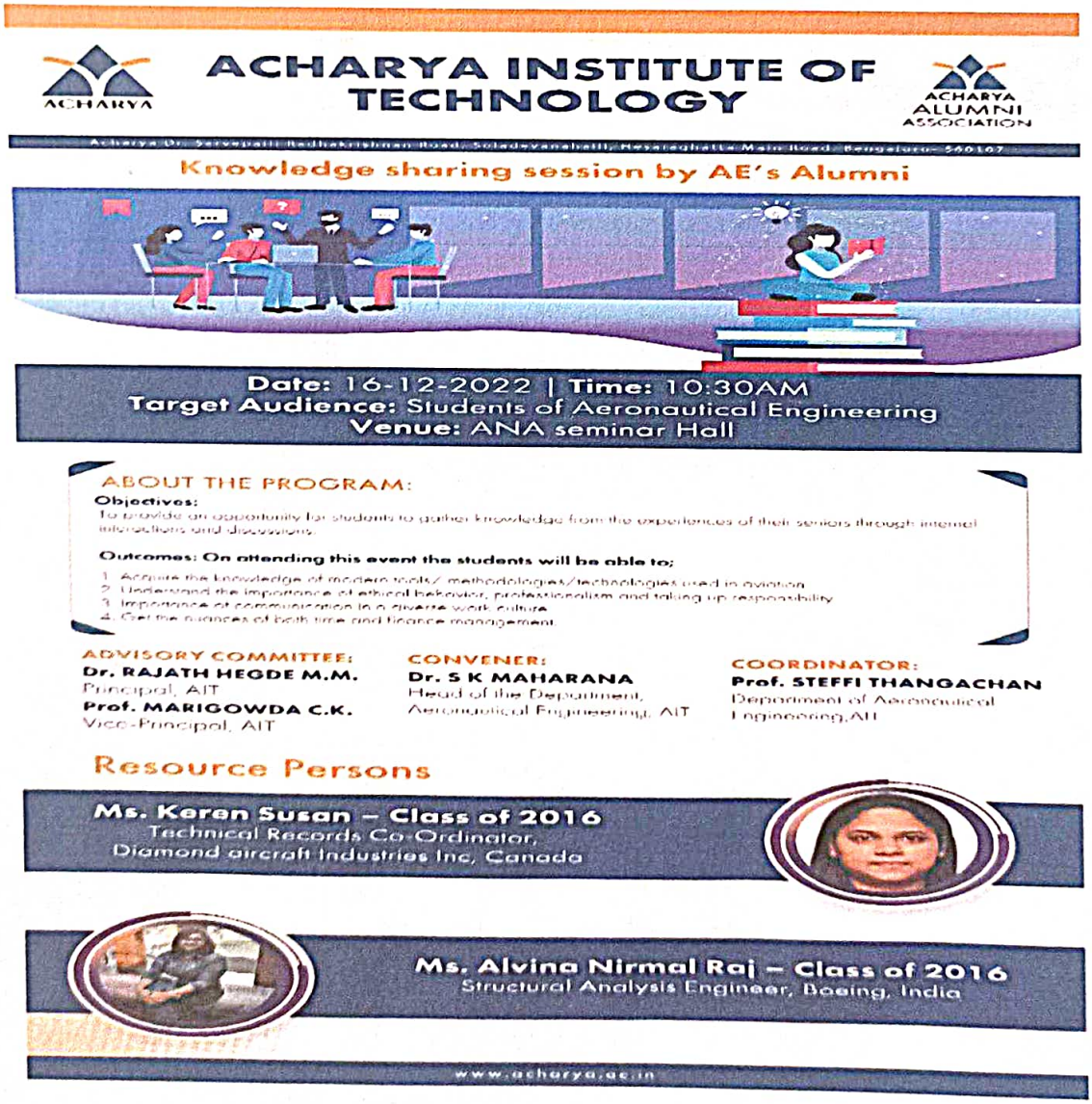
12.Peer learning – Seminars by senior / alumni students:

This is the opportunity for alumni to share their expertise and experiences with their peers, facilitating a dynamic learning experience for all their juniors.

The purpose of the discussion seminar is for peers to talk together in a group about the topic they have just learned about. Discussion seminars tend to be unstructured and designed to have students jump in with thoughts or contributions when they feel they have something important to add. To provide a Realtime experience of particular subjects for exchange of ideas on academic, also recent trends.

These tend not to have a Alumni presence and are often organized by peers themselves.



Objectives:

To enhance the practical skills and competencies related to a particular subject or field and also to learn from subject matter experts who share their expertise and insights.

Expected outcomes:

To develop competence in specific techniques, tools, or methodologies, to network with industry professionals, experts, peers and also to establish valuable connections, seek mentorship, and explore potential career opportunities.

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13.Learning through Hands-on-workshop /training/ guest lectures / seminars

These learnings are an effective and immersive approach that allows participants to actively engage with the subject matter and acquire practical skills.

Fig 13. 1 a & b Advanced Ansys-Workbench training & practicing session

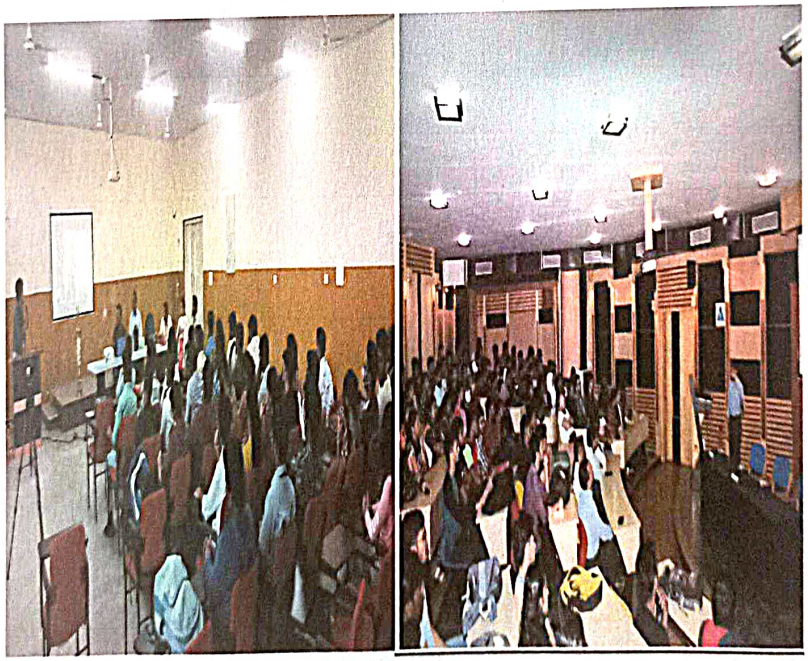

Fig 13.2 a & b IoT workshop & Invited talk on concept of boundary layer theory

Objectives:

To facilitate the sharing of knowledge, real-world experience and insights that can provide valuable perspectives to current students and also to cover a range of topics, including industry trends, career advice, practical skills, and specific subject areas.

Expected outcomes:

Transformative impact on current students by providing them with valuable knowledge, guidance, inspiration and also the alumni to give back to their alma mater and contribute to the success of future generations of students.

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