

# AIRBENDERS

The Aeromodelling Club of Amity Institute Of Aerospace Engineering



**Who We Are** – We are a group of people comprising of select highly talented students of Aerospace/Avionics Engineering who share a common passion for fixed and rotary wing scale flying. We design and manufacture drones of various shapes and sizes for specific missions like payload delivery, long range reconnaissance, and high endurance autonomous flight.

We use knowledge which is sourced through our own interests and through our curriculum and apply it effectively in our work.

The idea of the club is to provide interested hobbyists with the resources and the knowledge to execute and come up with new and practical ideas that would help them in the future or just help them relate with the more practical aspects of the theoretical knowledge that is given to us in our classrooms.



SCAN TO KNOW MORE ABOUT WHAT WE DO

## WORKSHOP CURRICULUM –

Semester	Objective	Description	SLO
<b>2nd</b>	Workshop - Basics of Aeromodelling	The Basics of Aeromodelling Workshop offers students a comprehensive introduction to the exciting field of aeromodelling. This hands-on workshop combines theoretical knowledge with practical experience to provide a solid foundation in aerodynamics, aircraft design, and remote-controlled (RC) aircraft operation.	<ol style="list-style-type: none"><li>1. Understand the fundamental principles of flight and aerodynamics.</li><li>2. Explore the principles of aircraft design, including structural considerations and aerodynamic optimization and various other calculations required to proceed.</li><li>3. Develop proficiency in building/fabriating and flying aircraft.</li><li>4. Gain practical experience through hands-on activities, simulator sessions , and real-world rc flying.</li></ol>
<b>3rd</b>	Workshop - Payload aircraft workshop	The RC Payload Dropping Aircraft Workshop is designed to equip students with the knowledge and skills to build and operate remote-controlled (RC) aircraft capable of carrying and delivering payloads. Through a combination of theoretical learning and hands-on practical exercises, participants will explore payload calculation methods, design considerations, and flight dynamics specific to payload dropping operations.	<ol style="list-style-type: none"><li>1. Understand the principles of payload dropping operations and its applications in various fields.</li><li>2. Develop proficiency in calculating payload capacity and its impact on aircraft performance.</li><li>3. Learn techniques for integrating payload release mechanisms into RC aircraft.</li><li>4. Gain practical experience in building, testing, and flying payload dropping aircraft.</li><li>5. Understand safety considerations and regulations related to payload dropping operations.</li></ol>

	Workshop - Introduction to Rocketry	<p>Introduction to Model Rocketry serves as an introductory session to acquaint students with the fundamental concepts of model rocketry. Participants will be exposed to the historical context and evolution of rocketry, gaining insights into the development of model rockets as miniature versions of their larger counterparts. Key components and safety protocols will be elucidated, fostering a comprehensive understanding of the building blocks required for constructing model rockets. Practical engagement will be emphasized through a demonstration of a simple model rocket assembly and launch, kindling participants' interest and curiosity in the subject matter. The ultimate objective of this workshop is to instill a foundational knowledge base, paving the way for further exploration and proficiency in the realm of model rocketry.</p>	<ol style="list-style-type: none"> <li>1. Understand the fundamental principles of aerodynamics and stability in model rocket design.</li> <li>2. Comprehend the different stages of a model rocket's flight and their importance.</li> <li>3. Gain knowledge about the key components and materials used in model rocket construction.</li> <li>4. Learn essential safety protocols and guidelines for handling model rockets.</li> <li>5. Acquire practical skills in assembling and launching a basic model rocket.</li> </ol>
4th	Workshop - Electronics	<p>The Electronics in Aeromodelling Workshop offers participants a comprehensive exploration of the role of electronics in the field of aeromodelling. Through a combination of theoretical knowledge and hands-on practical exercises, students will learn about the various electronic components, circuits, and systems used in remote-controlled (RC) aircraft. From understanding basic electronic principles to implementing advanced flight control systems, this workshop will provide a solid foundation in integrating electronics into aeromodelling projects.</p>	<ol style="list-style-type: none"> <li>1. Understand the basics of electronics and their applications in aeromodelling.</li> <li>2. Gain knowledge of various electronic components and systems used in RC aircraft.</li> <li>3. Learn techniques for integrating electronic flight control systems into aeromodels.</li> <li>4. Develop skills in soldering, wiring, and troubleshooting electronic circuits.</li> <li>5. Acquire knowledge about endurance calculations , and various other forms of electronics .</li> </ol>

	<p>Workshop - Software Simulation of Aircrafts</p>	<p>The Modeling, FEM Simulations, and CFD Simulations Workshop offers students a comprehensive exploration of software tools essential for product development in the field of aeromodelling. Participants will learn to utilize Fusion 360 for 3D modeling and design, perform Finite Element Method (FEM) simulations for structural analysis, and conduct Computational Fluid Dynamics (CFD) simulations for aerodynamic analysis. This hands-on workshop empowers students to apply software tools to enhance the performance and design of their aeromodelling projects.</p>	<ol style="list-style-type: none"> <li>1. Gain proficiency in 3D modeling and design using Fusion 360 software.</li> <li>2. Understand the principles and applications of Finite Element Method (FEM) simulations for structural analysis.</li> <li>3. Learn to perform Computational Fluid Dynamics (CFD) simulations for aerodynamic analysis.</li> <li>4. Apply software tools to analyze and optimize the performance of aeromodelling projects.</li> <li>5. Acquire practical experience through hands-on exercises and project-based learning.</li> </ol>
	<p>Workshop- Rocket Design and Construction</p>	<p>Rocket Design and Construction workshop delves into the realm of advanced rocketry, concentrating on the intricacies of rocket design and construction. Participants are exposed to the pivotal principles of aerodynamics and stability, enabling them to optimize rocket performance. Emphasis is placed on comprehending the significance of distinct rocket stages and their precise deployment during flight. Through an exploration of diverse materials and components, attendees gain insights into constructing sophisticated model rockets, ensuring structural integrity and balance. The workshop fosters hands-on experience as students actively engage in building and testing their creations, further refining their technical acumen. By promoting safety protocols and collaborative group projects, participants develop problem-solving skills and an elevated level of competence in managing intricate rocket designs. The ultimate goal is to inspire a profound passion for aerospace engineering and stimulate a desire to pursue further studies in the dynamic field of rocketry.</p>	<ol style="list-style-type: none"> <li>1. Master principles of advanced rocket design, emphasizing aerodynamics and stability for optimal performance.</li> <li>2. Understand the significance of different rocket stages and their sequential deployment during flight.</li> <li>3. Acquire knowledge about materials and components used in constructing complex model rockets.</li> <li>4. Develop hands-on experience by building and testing sophisticated model rockets.</li> <li>5. Cultivate a deeper passion for aerospace engineering, inspiring further exploration and studies in rocketry and related technical fields.</li> </ol>

	Workshop - Multirotor	<p>The Multirotor Workshop is an immersive program that introduces students to the world of multirotor aircraft. Students will learn about various types of multirotors, with a specific focus on 5-inch and 550-sized quadcopters. Through hands-on activities, they will build and configure their own quadcopters, gaining practical skills in drone assembly, electronics integration, flight control systems, and piloting techniques.</p>	<ol style="list-style-type: none"> <li>1. Understand the principles and characteristics of multirotor aircraft.</li> <li>2. Learn about the different types of multirotors, with a focus on 5-inch and 550-sized quadcopters.</li> <li>3. Gain hands-on experience in building, configuring, and fine-tuning (PID) quadcopters.</li> <li>4. Develop skills in electronic systems integration, flight control, and piloting techniques.</li> <li>5. Learn safety practices, flight maneuvers, and troubleshooting for multirotor aircraft.</li> </ol>
<b>5th and 6th</b>	Workshop - Fixed Wing Autonomous UAV / Autonomous Multirotor	<p>The Autonomous Flight Workshop is an immersive program designed to equip participants with the knowledge and skills to plan, execute, and control autonomous missions using Mission Planner software. Students will learn the fundamentals of autonomous flight, including mission planning, waypoint navigation, and automated flight control. Through hands-on exercises and project-based learning, participants will gain practical experience in designing and executing autonomous missions with unmanned aerial vehicles (UAVs).</p>	<ol style="list-style-type: none"> <li>1. Understand the principles and applications of autonomous flight in unmanned aerial vehicles (UAVs).</li> <li>2. Learn to use Mission Planner software for mission planning, waypoint navigation, and flight control.</li> <li>3. Develop skills in designing and executing autonomous missions for aerial data collection and surveillance.</li> <li>4. Gain practical experience in troubleshooting and fine-tuning autonomous flight systems.</li> <li>5. Understand safety considerations and regulatory compliance related to autonomous UAV operations.</li> </ol>

	Workshop - Advanced Rocketry	<p>Advanced Rocketry and Mission Planning Workshop delves into the frontiers of rocketry, encompassing advanced concepts, materials, and propulsion systems. Participants gain profound insights into the intricacies of rocket flight physics, enabling precise trajectory calculations and mission planning tailored to specific objectives. Engaging in simulations and problem-solving exercises, students sharpen their analytical and critical thinking skills, nurturing innovation in addressing complex rocket missions. The workshop endeavors to instill a deeper passion for aerospace engineering, motivating attendees to embark on further advanced studies in the ever-evolving field of rocketry.</p>	<ol style="list-style-type: none"> <li>1. Explore advanced concepts in rocketry, including cutting-edge designs, materials, and propulsion systems.</li> <li>2. Gain a comprehensive understanding of the physics governing rocket flight and trajectory calculations.</li> <li>3. Learn how to design rockets for specific missions and analyze their performance through simulations.</li> <li>4. Develop expertise in mission planning, considering factors such as payload capacity and desired destination.</li> <li>5. Engage in problem-solving scenarios related to complex rocket missions, fostering critical thinking and innovative solutions.</li> </ol>
<b>7th and 8th</b>	Minor and Major Projects	<p>Students are presented with management opportunities, including the role of president, vice president, secretary and treasurer which allows them to gain valuable leadership experience. Concurrently, they are encouraged to prioritize their personal growth by engaging in self-development activities. Additionally, students have the flexibility to undertake both minor and major projects, enabling them to delve into areas of interest and enhance their skills and knowledge.</p>	