

12

RESPONSIBLE CONSUMPTION AND PRODUCTION



2019-2023 Publications



2019-2023 Percentage of all Taiwan Publications



Course Units



Student Engagements with Units on SDG 12

103

2.9%

455

7,738



Research

Developing Low-Cost Recyclable Solid Rockets

A team of 11 students from the university's Graduate Institute of Space Systems Engineering, the SSTO team, successfully launched their homemade solid rocket at the XuHai launch site in Pingtung. After the launch, a recovery vessel retrieved the rocket from the ocean, completing the mission as planned. The SSTO team became the first at XuHai to achieve full rocket recovery post-launch. This mission aimed to develop a low-cost, recyclable rocket capable of flying 1 kilometer high, which could be used for future educational or competitive purposes. The rocket's propulsion system was designed using RNX solid propellant, which is both cost-effective and highly safe and could generate a maximum thrust of 200 kilograms. This mission was also part of the "Space Systems Integration" course, where students had only one chance to test the flight with limited resources. The team collaborated and planned the launch mission by applying systems engineering principles. The design featured a high degree of modularity and extensively used commercially available components to reduce costs, providing students with practical learning experiences in systems engineering and integration through hands-on work.

Research

Reducing Material Usage with Advanced Timber Technology

A team comprising Director Pei-Hsien Hsu, Associate Professor Jun-Hao Hou from the university's Graduate Institute of Architecture, and Professor Kristof Crolla from the University of Hong Kong designed and built a new wooden pavilion called "KATENARA" at the Dongshi Forestry Culture Park. This innovative wooden structure uses glued curved timber to create a catenary line structure. Although the lengths and curves vary, a single mold can be used for the entire structure. Using algorithms to optimize the mold shape reduces material consumption, significantly lowering the modeling cost. The installation does not require heavy machinery, making this an eco-friendlier and more sustainable wooden construction method. The completion of "KATENARA" demonstrates the advantages of using locally sourced wood, the sustainability of natural building materials, and their aesthetic value. It also serves as a design practice and contributes to public education on sustainable architecture.



Social Impact

DIYGreen Zero-Waste Circular Urban Farm Practical Foundation Course

Our university's Center for Continuing Education has introduced a "DIYGreen Zero-Waste Circular Urban Farm Practical Foundation Course." This course aims to promote the innovative DIY circular urban farm developed by Professor Jehng-Jung Kao and his research team at the Institute of Environmental Engineering. It is the world's first DIY urban farm that uses recycled bottles as its base. DIYGreen is designed to suit Taiwan's urban heat island characteristics. It allows for creating a garden on any flat concrete surface (such as balconies, terraces, ground level, or rooftops) where individuals can safely grow high-quality vegetables, fruits, and flowers. The DIY Green system is suitable for all ages, from children to seniors, who want to build gardens. It also offers numerous environmental and food safety benefits. The research team hopes that through this course, their findings and innovations can be widely shared with the general public, making sustainable urban farming accessible to everyone.

Integration of Environmental Protection and Architectural Aesthetics

The "2023 Island Bamboo Architecture Exhibition" is being held at the Guangfu campus of the university, exploring the potential applications of bamboo architecture in modern society. With bamboo as the primary construction material, the exhibition showcases the beauty of architecture while emphasizing its practicality in environmental protection and sustainable development. It also marks a new chapter in the development of Taiwan's architecture and bamboo industry. The project for the "2023 Island Bamboo Architecture Exhibition" focuses on creating small-scale bamboo structures that meet practical, social, aesthetic, and weather-resistant requirements, aiming to demonstrate the adaptability of bamboo construction in modern life. The exhibition area at the university features five architectural installation artworks, one of which is titled "MemutAR" (Bamboo Spiral Illusion Dwelling). This piece utilizes augmented reality technology to assist in patterning and recreating the construction methods of the Indonesian team, representing the environmental significance of bamboo construction and the collaborative cross-border production efforts.



Education & Cultivation

Recycled Fish Scales for 3D Printing and Circular Design Creations

The university's Innovation and Creativity Workshop (Innovative Creative Technology, ICT) offers a course titled "Fish Scale Paste 3D Printing." The course introduces how to use fish scales, a byproduct of the fishing industry, as a material for 3D printing. It utilizes parametric models to assist in designing container objects, creating hollow structures and surface textures that promote drying and reduce shrinkage, and prints them using a specialized 3D printer. In addition to explaining the process of handling discarded fish scales and the mechanisms of paste 3D printing, the course provides hands-on experience, allowing students to gain a deeper understanding of aquatic waste and related Sustainable Development Goals (SDG) issues.

Sustainability Week: Campus Car-Free Day and Sustainability Market

Our university hosted a Sustainability Week in response to global sustainability issues, showcasing the achievements of various university projects on social responsibility and sustainable development. Through the momentum generated by this event, we aimed to foster awareness and commitment among faculty and students toward sustainability issues. One of the key initiatives is "Car-Free Campus Day," which encourages all campuses to reduce car usage, walk more, and make better use of shared transportation options, with support led by the university president and administrative leaders. The "Sustainability Market" attracted local farmers and vendors and aligned with the university's initiatives to reduce disposable utensils and bottled water. Additionally, a weaving workshop was held to promote the recycling of old clothes, highlighting the importance of responsible production and consumption.

Stewardship

Green Procurement and Green Office Initiatives

Our university is actively participating in the "National Green Living" initiative, encouraging faculty, staff, and students to adopt carbon-reduction behaviors and environmental protection efforts, aiming to incorporate green living into daily life and collectively achieve the goal of net-zero emissions. From 2021 to 2023, the university has achieved a 100% response rate in both "green consumption" and "green office" initiatives. Green consumption prioritizes environmentally friendly, healthy, and renewable products to minimize negative impacts on ecological and environmental systems. Green office practices include conserving energy and resources in the workplace, such as holding virtual meetings, controlling indoor temperatures, enhancing environmental beautification, printing less and using double-sided paper, reducing elevator usage, minimizing disposable utensils and bottled water, practicing waste sorting and resource recycling, encouraging the use of public transportation, and choosing green venues for events.

Green Dining

Food is an indispensable part of campus life, and to create a sustainable campus environment, our university has implemented measures such as source reduction, minimizing food waste, and establishing sustainable dining management standards to foster a low-carbon dining environment. In addition to encouraging faculty and students to bring their eco-friendly containers when purchasing food, the university has organized a series of "Green Dining" lectures to educate the campus community on how to reduce carbon emissions through food choices and adopt source-reduction strategies. The lectures promoted habits like buying in appropriate quantities and consuming food on a first-purchased, first-eaten basis to reduce food waste. Moreover, the university has offered "Carbon Reduction in Dining" courses for food service providers, advocating the use of seasonal and locally sourced ingredients to reduce carbon emissions from food transportation and encouraging the procurement of organically farmed products grown through environmentally friendly methods.