112年

觀音山
環境與生態
教育年報



明志科技大學 MING CHI UNIVERSITY OF TECHNOLOGY
NANYA 南亞科技
SOW THE SOCIETY OF WILDERNESS 荒野保護協會
中華民國自然步道協會 Taiwan Nature Trail Society

從生態池談學生環境教育的實施

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生態池在環境教育中扮演著的角色，從小型水域的範圍中，飼養一些小動物，作為一個模擬自然生態系統。可為學生提供了實地觀察和互動的機會，以深入了解生態系統的運作和生物多樣的重要性。底下就從幾個方面探討這樣的生態系統如何影響學生的學習。

1、真實的體驗:

都市的小孩比較少機會直接接觸真實的大自然生態系統，生態池則提供這樣的一個環境，學生可以近距離的觀察不同物種的生長及彼此間的互動。這種直觀的學習環境可以激發學生的好奇心和興趣，並使他們更加關注和珍惜自然環境。

2、觀察生態系統:

生態池可以成為學生學習生態系統和生物多樣性的實驗場所。了解彼此間的食物鏈和生態平衡。可以觀察水體中的生物如何適應環境，如何尋找食物和棲息地。同時，學生還可以了解生態系統中的不同物種之間的相互依賴關係，以及人類對生態系統的影響。

3、探索生物與環境的互動:

通過觀察生態池中的生物和環境變化，學生可以探索和討論現實世界中的環境問題。他們可以觀察到水質、氧氣含量等因素的變化對生物的影響，並思考這些變化與人類活動的關聯。這樣的探索有助於學生理解環境問題的複雜性，並激發他們尋找解決方案和採取行動的意願。

4、提供學生進行科學實驗和研究的機會:

學生可以搜集和分析生態池中的數據，例如水質、溫度、氧氣含量等，利用科技的方法取得上述問題的數據，並觀察這些因素對生物的影響。以科學的方式結合科技設計和執行實驗，以瞭解不同因素對生態系統的影響，培養科學方法和研究技能。





5、學習團隊分工的能力:

學生針對生態池的照顧，可以進行團隊的合作，學習如何組成小組，共同管理和照顧生態池，例如清潔水池、飼養和觀察生物等。培養學生的團隊合作能力、溝通能力和領導能力。此外，學生還可以舉辦校園的環境教育展示活動，透過活動學生可以學習資料的呈現或資料的講述，從中訓練穩健的台風或邏輯感，對未來不論在升學口試或學習歷程檔案的準備，都有潛在的好處。

另一方面，因生態池系統不單純只有生物，如採光、打氣機等，可以促進教師們在課程準備的過程中，有跨學科合作的機會，諸如電機、機械等工程學科也有合作的機會，可增進教師們跨領域學習知識和團隊知識分享的機會，進而組成一種社群的學習組織。

世界綠行動—
氣候與自然共好Action!

文/南亞科技股份有限公司

2022年底，在COP15中，通過了「昆明—蒙特婁全球生物多樣性框架(Kumming-Montréal global biodiversity framework)」。此框架包含協助生態環境、傳統住民資源，以及明訂須在2030年，保護地球上30%的陸地、內陸水域、沿海與海洋區域。

南亞科技自2012年起，自主展開周邊生態環境監測調查，長期關注氣候變遷與自然議題的我們，也在2023年發布「生物多樣性政策」，承諾實踐管理自然風險，並主動於明年正式發佈南亞科技第一本「氣候暨自然與財務揭露報告書」，揭露對於氣候變遷及自然議題的策略及行動。

除政策面外，南亞科技每年規劃不同活動，攜手公司同仁共同認識自然，號召志工守護周邊環境，以南亞科技為中心為鄉親鄰里做出行動，2023年我們也規劃一系列世界綠行動：

世界綠行動1-環保淨山日

南亞科技於3/4(六)在公司廠區舉辦環保淨山日，有將近80名南亞科技志工同仁帶著眷屬熱情參與。淨山當天氣候舒爽，一群人在廠區周邊的道路及登山步道，將不屬於山林的垃圾帶走，以及將溝渠中的落葉和樹枝鏟起，避免下雨天時溝渠無法排水，簡單的作為就是感謝美麗河川的具體表現。早起的大家活力充沛，大朋友小朋友都奮力地在撿拾垃圾、掃除落葉，路過的登山客向大家說謝謝，讓這片山林更美好，也拉近人與人之間的距離。淨山活動除了撿拾垃圾，也是帶著家人認識公司及周邊環境的最好時機，更棒的是能夠欣賞山下風景，原來我們每天經過的地區有這麼多歷史。

淨山活動當天除了是南亞科技28週年，也是南亞科技志工隊成立滿2週年的日子！我們邀請當天參加淨山的同仁一起為志工隊慶祝，期許志工隊未來有更多同仁及眷屬加入，越來越茁壯，一起讓社會變得更美好。





世界綠行動2-物種大調查

4/15舉辦物種大調查活動，邀請大朋友、小朋友們化身成為大自然觀察的公民科學家，用手機拍照紀錄觀察不同物種，藉由上傳到iNaturalist愛自然APP，由AI判斷各種物種的名稱，更加認識南亞科技周邊大自然的生物，許多同仁藉此更加留意生活旁不常注意的小小生機，上傳的資料更是作為大數據，統計出南亞科技周遭多元的物種，為生物多樣性盡一份心力。之後更在公司內舉辦Eco智多星活動，提供氣候變遷相關知識，讓同仁更加認識溫室氣體、氣候中和、淨零排放等議題，而這些議題與生活息息相關，一不小心我們的自然生態生活的環境都會有影響，讓同仁了解不只企業要注重氣候，身為地球人的我們更要重視氣候變遷這個議題!





世界綠行動3-移除外來種小花蔓澤蘭

小花蔓澤蘭原產於中南美洲，1950年以後被引進南亞及東南亞做為地被植物栽種，幾十年來向外擴散，因強勢的入侵特性被國際自然保育聯盟(IUCN)列為世界百大外來入侵種，被評列為極具威脅性的世界及惡性雜草，因其繁殖能力非常強，除了可無性生殖，還會攀爬纏繞在樹上，讓樹木無法行光合作用後慢慢衰弱死亡，造成植物林相從多樣性走向單一性，對環境生態的影響相當大。
每年10月到隔年2月就是小花蔓澤蘭的開花結果期，避開這段期間的3 月到9月，就是移除小花蔓澤蘭的最佳時機，目前移除小花蔓澤蘭的最佳方式就是徒手清除。

南亞科技自2020年起與荒野保護協會合作，於五股溼地移除小花蔓澤蘭。5/27(六)當天志工同仁帶著眷屬，不畏烈日，找出外型像狐狸臉的小花蔓澤蘭，然後連根拔起，6/9(五)當天，由總經理擔任領隊，帶著公司高階主管加入移除小花蔓澤蘭行動，今年共移除184.3公斤，一起為守護濕地及維持生物多樣性盡一份心力。

未來，我們將規劃更多生態保護、環境教育活動，期許同仁能透過實際行動，與自然共好。



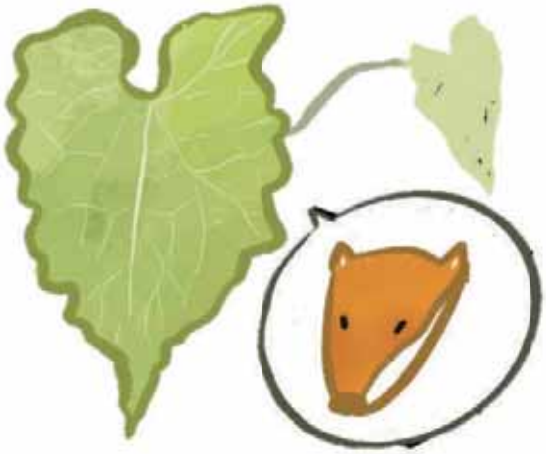
同仁帶著孩子們一起參與移除小花蔓澤蘭，成為最有感的環境教育活動



南亞科技李培瑛總經理也親自為移除小花蔓澤蘭行動盡一份心力



志工同仁頂著烈日，努力將外來種連根拔起



小花蔓澤蘭的葉子長得像狐狸臉，在移除前必須要先好好辨認，才不會誤拔其他植物

移除小花蔓澤蘭

1.同仁帶著孩子們一起參與移除小花蔓澤蘭，成為最有感的環境教育活動

2.志工同仁頂著烈日，努力將外來種連根拔起

3.小花蔓澤蘭的葉子長得像狐狸臉，在移除前必須要先好好辨認，才不會誤拔其他植物

4.南亞科技李培瑛總經理也親自為移除小花蔓澤蘭行動盡一份心力

物種大調查

1.運用iNaturalist APP 辨識公司周遭的自然物種

2.透過此活動培養同仁對自然的觀察力，建立與自然「共存」到「共好」的素質。

淨山

1.淨山為南亞科技例行性志工活動

2.經過同仁的努力，將溝渠中的落葉、垃圾清除，維護其排水功能

3.未來將與在地產生更多連結，一同與自然共好。







2023

明志科技大學
MING CHI UNIVERSITY OF TECHNOLOGY

Sustainability Report

1.6 Sustainable Landscape

(A) Sustainable Ecological Forest Footpaths

A1 High-quality green ecological environment of the campus
A2 Ecological diversity
A3 Ecological hiking forest footpath
A4 Ecologically inclusive walkway
A5 Ecological landscape rest areas
A6 Ecological conservation corridor

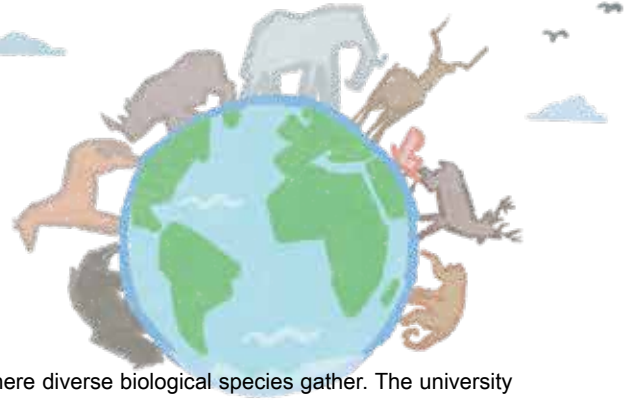
(B) SDGs Sustainability Exploration

B1 SDGs image logo of MCUT
B2 Indigenous totem
B3 Formosan Indigenous Park
B4 SDGs light wall indicators
B5 Bronze statue of Confucius
B6 Transformer

(C) Sustainability History of MCUT

C1 Founder Memorial Park
C2 The wisdom of FPG's grandma from growing vegetables
C3 Legend of the rice shop
C4 Origin of Formosa Plastics Group
C5 Dynamic playground of Formosa Plastics
C6 Diligence and simplicity





（A） Sustainable Ecological Forest footpath

MCUT's green campus allows teachers and students enjoy learning in the refreshing natural surroundings.

A1 High-quality green ecological environment of the campus

In this rapidly changing era, MCUT still maintains a serene and lush green campus which extensively occupies an area of 62 hectares, with 74.2% covered in green plants. This is not only an ecological sanctuary, but also a place where various trees aged 20-30 on average grow, including several ancient trees aged over a century. They have silently witnessed the growth and great development of generations of MCUT students. They are not only part of the natural ecology, but also tell the historical stories of this university.

A2 Ecological diversity

MCUT's campus is a vibrant ecosystem where diverse biological species gather. The university provides an ideal location for students to conduct field studies and research. It aims to remind every student at MCUT about their experiences exploring nature on campus and the significance of preserving biodiversity and promoting global sustainability as they navigate future careers in highly industrialized environments.













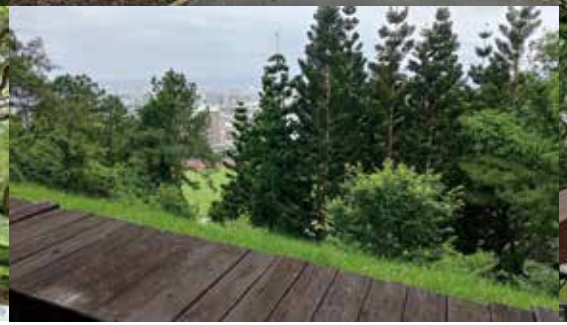
A3 Ecological hiking forest footpath

The total length of the footpath on campus is approximately 1.94 km. Along this footpath, from the university entrance gate to the enterprise education center, you can enjoy stunning views and admire the beautiful scenery of Taishan District from a high vantage point. The footpath is also adjacent to the popular Qitou Trail, a well-known hiking trail in Taishan District. The well-maintained hiking footpath allows people to reach the mountain peak, visit the plant area of Nanya Technology, and enjoy panoramic views of Taipei City and New Taipei City. The forest footpath on the MCUT campus serves as a green corridor connecting the campus to the surrounding natural landscapes. It provides students with a learning opportunity to experience nature and explore ecological diversity. This footpath enables MCUT teachers and students to develop a broader vision, comprehensively view urban development in these two cities from Taishan, and reflect on environmental sustainability.

A4 Ecologically inclusive walkway

Every old tree lining this pathway has ample space to thrive. A diverse array of creatures calls each tree home, from animals such as squirrels, butterflies, Chinese bulbuls, and Japanese White-eye, to various plant species like ferns. They all contribute to the local ecosystem. The presence of these trees along the pathway is both rare and praiseworthy. In this environment of learning and living, they impart valuable lessons to both teachers and students at MCUT, demonstrating how to peacefully coexist with nature and complement technology with the natural world. This pathway serves as a vivid example of the harmonious relationship between nature and humankind.





A5 Ecological landscape rest areas

The MCUT campus includes about seven parks and landscape rest areas, such as Diligence and simplicity Park, Formosan Indigenous Park, Simplicity Park, Founder Memorial Park, etc. The campus is open and planned with green environmental facilities, and seedlings are self-cultivated and provided for campus greening and beautification. In this space for learning and living, staff members who use computer screens for a long time and students conducting day-long experiments at laboratories are able to enjoy a green view when leaving buildings. Furthermore, outdoor ecological classrooms are set up in the university, which significantly benefits the creation of a humanistic environment.

A6 Ecological conservation corridor

The artificial channel in front of the teaching building continuously flows with a water depth of approximately 3-5 cm throughout the year. It is surrounded by a variety of grasses and sparse trees, such as linden, camphor, banyan, daphne odera, longan, coconut, osmanthus, and camellia. Along this corridor, there is abundant sunlight and a diverse range of food. Many birds visit this area to find food, drink water, and clean their feathers. Additionally, the unique freshwater crab species, Geothelphusa olea, which is native to Taiwan, can be spotted here. MCUT is situated near a mountain with rich and diverse ecology, allowing all teachers and students to enjoy a favorable ecological environment. In promoting sustainable development goals, MCUT aims to raise awareness about terrestrial conservation.








Campus Greening Management

The MCUT campus features about seven parks and landscape rest areas, including Diligence and simplicity Park, Formosan Indigenous Park, Simplicity Park, Founder Memorial Park, and others. Flower houses have been established on campus to enhance the beauty and greenery of the environment. These facilities are open for visitors, teachers, and students to enjoy. The shrub planting area on campus covers approximately 5,300m2. The main tree species have an average age of 20-30 years. Various animals such as squirrels, snails, frogs, crabs, snakes, bamboo partridges, and a variety of birds including turtledoves can commonly be seen on campus. More recently, creatures such as butterflies and fireflies have also been observed, showcasing the diverse campus ecology and the success of campus greening.

Amount spent in campus greening in the past three years

Unit: NT$

	2021	2022	2023
Labor contracts with gardening staff	4,340,705	4,470,852	4,378,576
Expenses related to planting for campus greening and beautification	174,300	158,550	804,694
Total	4,515,005	4,629,402	5,183,270

Recycling of Horticultural Waste on Campus

The campus has abundant native plants, forests, and green spaces. In the past, campus staff conducted annual pruning and branch trimming. Currently, wood chippers have been purchased to dispose of non-easily rotted tree branches that take up space. This helps in achieving the goals of soil improvement and waste reduction. The types of horticultural waste on campus can be generally classified into four categories: fallen leaves, branches, trunks, and others.

Type	Classification method	Processing method
Fallen leaves	The fallen leaves are gathered and stacked in open-air fermentation areas each morning.	The fallen leaves will naturally ferment and be used as organic fertilizers.
Branches	Branches sorted have a diameter below 12cm.	After wood chippers are used for treatment, the wood chips are used as organic matter for soil improvement.
Trunks	Branches sorted have a diameter above 12cm.	The branches are manually cut into 50cm sections as hedge materials.
Others	Weeds cleared during slope maintenance on campus	Directly covered on the slope for natural decomposition into organic fertilizers.

Processing of Yellow Leaves of Royal Palm Trees

is a Coconut Grove Avenue that presents a unique local landscape. However, since the trees have already been planted for many years with heights reaching three to four stories of general buildings, falling coconut leaves may harm pedestrians and vehicles. We want to protect the environment and trees, so we will strengthen publicity to remind students, teachers, and other people to be vigilant when walking under the coconut grove. Additionally, we will utilize monthly maintenance work to patrol yellow leaves from the coconut trees. When yellow leaves are found, cranes will be used to conduct high-altitude operations to remove these leaves and maintain the safety of the campus and people passing by.

Recycling of Pruned Branches on Campus

In the current year, MCUT collaborated with ReWood, an expert in providing solutions for remaining forestry materials. We transported 9 tons and 6 tons of pruned branches to ReWood for effective utilization in March and May, respectively. To maintain campus greening and ensure students' safety, MCUT checks its campus trees yearly and periodically prunes trees that affect pedestrians and vehicles. Furthermore, we would track, prune, or remove diseased trees. However, pruned trees on campus were usually directly transported to incinerators for incineration, lacking effective utilization. ReWood implements high-value recycling of pruned branches on campus and uses the recycled branches for professional charcoal production. Then, the charcoal will be processed and made into dehumidification packs or air-purifying charcoal planters. The pyroligneous generated during charcoal production can also be used to make environment-friendly detergents, reducing environmental burdens. The selected pruned branches can also be used as woodworking materials. As a result, the campus trees can be reconnected with people's lives again as quality home decorations. During the charcoal production process, people can receive environmental education, experience ecological sustainability, and carry out woodworking skills so that culture and forestry ecology continue to thrive.







4.5 Waste Management

To ensure that waste recycling is effective, MCUT has implemented measures to manage, reward, and penalize the income from resource recycling and selling. These measures aim to encourage faculty, students, recycling and waste disposal vendors, and cleaning teams in New Taipei City to actively promote mandatory waste classification, waste reduction, and resource recycling. This will help in achieving a sustainable circulation of resources. The primary waste sources at MCUT are general waste and laboratory waste. To effectively manage and maintain the safety of the campus environment, MCUT has installed an environmental management system and pollution prevention and control facilities in accordance with relevant environmental protection laws and regulations. This is done to monitor the operation and quantity of laboratory waste liquid and to prevent accidents or pollution.

General Waste Management

We use two primary methods to ensure effective waste treatment: incineration and resource recycling. MCUT works with contracted vendors to regularly clear and transport waste to relevant incineration plants in New Taipei City for non-recyclable waste, ensuring safe and environmentally friendly disposal. As for recyclable resources, our cleaning personnel first classify them and then use dedicated recycling vehicles to transport these resources to the resource recycling center for sale. To further improve waste recycling benefits, the Office of General Affairs uses income from resource recycling to purchase recycling facilities and reward classes with excellent performance in classroom cleaning competitions. These competitions not only encourage students to participate in resource recycling actively but also help in continually improving the campus environment.

From 2022, we have started to intensively recycle used batteries to reuse valuable resources and reduce the risk of fire or explosion. This is crucial to prevent hazardous incidents that may occur when waste batteries are mistakenly mixed with general waste and placed in garbage trucks where they can be compressed, squeezed, or cause friction. The two student restaurants on campus are estimated to produce 77.32 tons of kitchen waste, including leftovers, vegetable trimmings, peels, food scraps, and other related materials. The restaurants collaborate with a waste management vendor to recycle this kitchen waste, ensuring effective handling and reutilization while minimizing adverse environmental impact.

Statistics of general waste disposal in the past three years

Unit: tons

Disposal status of general waste		2021	2022	2023
Incineration		276.9	310.1	317.2
Resource recycling	Waste paper (including paper containers)	49	65.2	55.4
	Scrap metal	6	5.15	4.31
	Waste PET bottles	3	6.42	7.73
	Others (including batteries)	4	9.7	1.79

Resource recycling

- Resource recycling and storage facilities are set up in the teaching area and each department to classify and collect resource waste. The waste is delivered for treatment using dedicated resource recycling vehicles.
- Translucent plastic bags are used and practices like "Unbagging Check" on the site are adopted to implement the goal of waste checking and reduction.





• Resource recycling operation area

Deadwood and fallen leaves

- Various kinds of deadwood and fallen leaves are delivered to the MCUT's horticultural composting sites for composting. As a result, the campus soil can be improved.





• Recycling and stacking point of fallen leaves

Others

- In 2023, 673.1kg of batteries were recycled, an increase of 399.1kg compared with 2022. There were 477 second-hand items in 2023, an increase of 123 pieces compared with 2022.



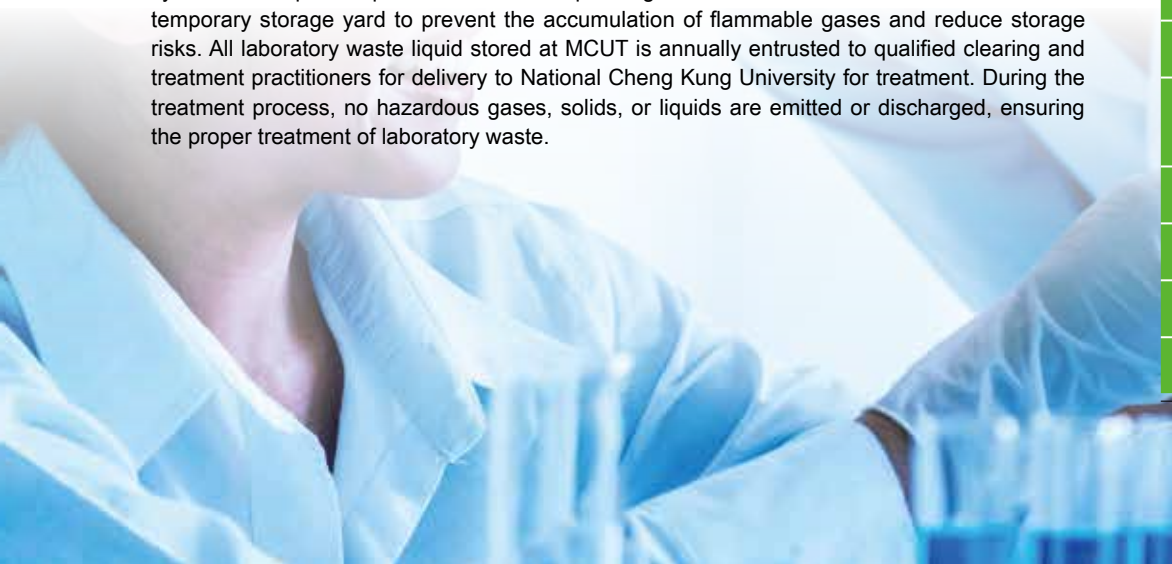


• Second-hand product market

Industrial Waste Treatment (Laboratory Waste Liquid)

MCUT has established the Safety and Health and Toxic and Concerned Chemical Substances Control Committee to oversee the management of laboratory waste and toxic substances. Furthermore, MCUT has handled and disposed of relevant substances in accordance with the provisions of the Waste Disposal Act and the 'Toxic and Concerned Chemical Substances Control Act for Academic Institutions'. In order to manage laboratory waste liquid, MCUT has implemented the 'Campus Hazardous Industrial Waste Control System' to effectively monitor operational status and waste quantity, and mitigate the risk of accidents or pollution. A key part of our approach is promoting measures such as waste reduction at the source of chemical usage and allocation, in order to minimize expiration and waste of chemicals, demonstrating our commitment to environmental sustainability.

Laboratory waste liquid is classified as general industrial waste (category D) and hazardous industrial waste (category C) based on its characteristics. When the storage barrels in each laboratory reach about 80% of their full capacity, the relevant personnel will arrange for these barrels to be delivered to MCUT's temporary waste liquid storage yard. To ensure proper temporary storage of laboratory waste liquid, a 24-hour combustible gas detection and monitoring system and explosion-proof exhaust fans operating at fixed intervals have been installed in the temporary storage yard to prevent the accumulation of flammable gases and reduce storage risks. All laboratory waste liquid stored at MCUT is annually entrusted to qualified clearing and treatment practitioners for delivery to National Cheng Kung University for treatment. During the treatment process, no hazardous gases, solids, or liquids are emitted or discharged, ensuring the proper treatment of laboratory waste.



Industrial waste (laboratory waste liquid) in the past three years

Unit: Ton

Category \ Year	2021	2022	2023
General industrial waste			
D-1502 Non-hazardous waste alkali	0.32	0.64	0.695
D-1503 Non-hazardous waste acid	0.34	1.34	0.715
D-1504 Non-hazardous organic waste liquid or solvents	1.30	3.02	0
D-1599 Non-hazardous mixing waste liquid	0.10	0.57	0.44
D-2301 Halogenated organic chemicals	0	0	0.038
D-2302 Non-halogenated Organic c chemicals	0	0	0.71
Hazardous Industrial Waste			
C-0299 Corrosive Waste Mixtures	0.07	0.405	0.3658
C-0399 Flammable Waste Mixtures	0.46	0.375	0.32
Total	2.59	6.35	3.2838

4.6 Biodiversity

MCUT prioritizes biodiversity conservation. The Fifteenth Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP15) in 2022 resulted in adopting the Kumming-Montréal Global Biodiversity Framework. A key component of this framework is the "30 X 30" goal, which aims to effectively protect and manage 30% of the world's lands and oceans with biodiversity by 2030. MCUT is committed to understanding and implementing the Kumming-Montréal Global Biodiversity Framework. In alignment with this framework, MCUT will gradually increase financial support to enhance biodiversity conservation efforts.

Inventory of Biodiversity Hotspots around the Campus

MCUT is situated at the foothills of Guizi Village, Taishan District, New Taipei City, covering an area of 0.62 km2. MCUT has conducted an inventory of biodiversity hotspots within its operation scope using the LEAP (Locate, Evaluate, Assess, Prepare) method to identify natural risks. It has also adopted the Species Emergence Record Query established by the Taiwan Biodiversity Information Alliance (TBIA) to investigate records on the emergence of conservation species around the campus. Initially, MCUT conducted the survey according to relevant data from the Biological Investigation Database established by the Forestry and Nature Conservation Agency, MOA. MCUT is 1.75km and 2.88km away from Xinzhuang Water Conservation Forest (green part), the nearest shelter forest, and Taoyuan's Reservoir and Canal Wetland (blue part), a







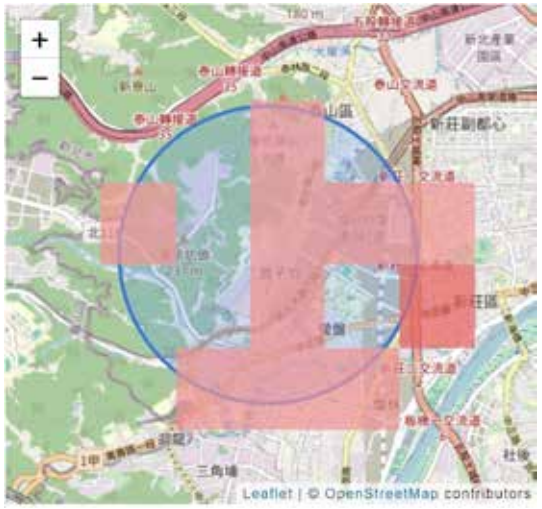
- Investigation results of the Biological Investigation Database. The record on Spilornis cheela has been obtained from the special issue of Foothills · Ecology-Natural Ecological Resources of Taishan.

national wetland, respectively. MCUT conducts operating activities as a university research organization and, therefore, does not impose any direct impact on the biodiversity of these two places. We will continually observe our potential impact on the biodiversity hotspots in these two places and establish relevant management approaches to address biodiversity, thus contributing to the campus's biodiversity.

Additionally, according to relevant data from the "Species Emergence Record Query" established by the Taiwan Biodiversity Information Alliance (TBIA), there were records of the emergence of 7 conservation species within a 2km radius around MCUT (latitude/longitude: 121.42239725449349, 25.041228287119147) in 2023. These species are Zhangixalus taipeianu, Acridotheres cristatellus, Milvus migrans, Otus lettia, Urocissa caerulea, Lanius cristatus, and Spilornis cheela. Among them, a total of 42 bird species, including Spilornis cheela, Otus lettia, and Urocissa caerulea, were active within the campus and were recorded and included in the special issue of Foothills · Ecology-Natural Ecological Resources of Taishan. MCUT will continually track records on the emergence of conservation species around the campus and plan and formulate relevant policies to sustain biodiversity.





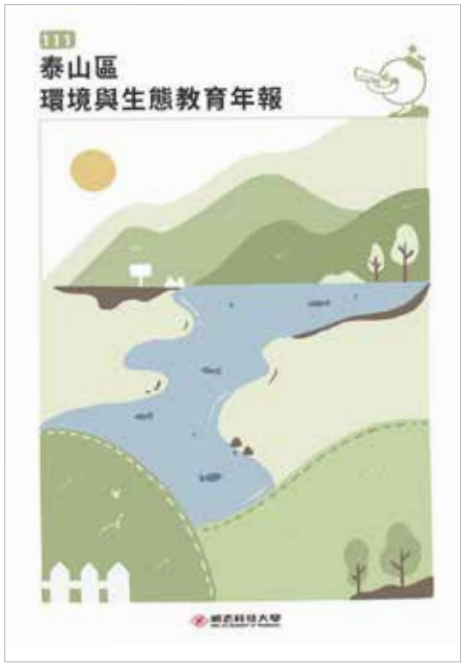


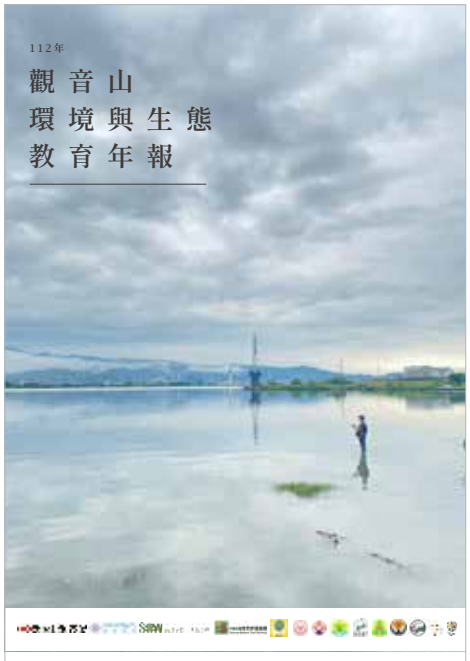
- Results of TBIA Species Emergence Record Query. Records on Otus lettia and Urocissa caerulea have been obtained from the special issue of Foothills · Ecology-Natural Ecological Resources of Taishan.

Water Quality Monitoring in Taishan and Wugu and Water Environment Patrolling Team

Since the trial period of MCUT's USR Practice Project in 2017, we have been involved in exploring local issues through environmental monitoring. Using our expertise, we have conducted water quality and air pollution monitoring in Taishan District since June 2018. After four years of carrying out these activities, MCUT has established strong partnerships with the Xinzhuang Community University Water Environment Patrolling Team under the Water Resources Department, New Taipei City Government, and the Wugu Wetland Water Environment Patrolling Team under the Environmental Protection Department, New Taipei City Government. In October 2019, the Soil and Water Conservation Management Section under the Environmental Protection Department, New Taipei City Government, invited MCUT to establish the Taishan Water Environment Patrolling Team. This collaboration integrates our faculty and students as the cooperation targets, with the guiding expertise of the Xinzhuang Community University Water Environment Patrolling Team, forming a unique university-led water patrolling team. We regularly publish water quality monitoring items and data from Taishan District and Wugu District in local Facebook communities and provide them to the Environmental Protection Department, New Taipei City Government, for reference. The testing data for each period has already been announced on the community and the project's webpage for future reference.

MCUT has sought help from local school education directors at all levels since 2022 to jointly compile the Annual Report of Environmental Education of the Taishan District. This report was later renamed to the Annual Report of Environmental and Ecological Education of Guanyin Mountain in 2023. As part of our water pollution monitoring project, MCUT tests the water quality of 6 sites in Taishan District, New Taipei City, and twice a month (at the beginning and middle of the month). We also test the water quality of 7 sites in Wugu District, New Taipei City, once every month (at the end of each month). The test items are classified into four levels based on international pollution standards: 1. No pollution or slight pollution; 2. Mild pollution; 3. Moderate pollution; 4. Serious pollution. The testing indicators include four water quality parameters: 1. Suspended solids; 2. COD; 3. Dissolved oxygen; 4. Ammonia nitrogen. These parameters are integrated into the River Pollution Index (RPI). MCUT utilizes the professional knowledge of teachers and students from its Department of Safety, Health, and Environmental Engineering to contribute to the local communities. Relevant testing data is released on Facebook communities such as "Life Education Commune in Xinzhuang, Wugu, Taishan, and Linkou," "We are Taishan





People," and "I'm a Wugu Person" to continue drawing attention from the local community residents to the local water environment.

MCUT will regularly collect water samples from 6 sites in Taishan District, seven in Wugu District, and three in Xinzhuang District, newly added in 2023. Approximately 700 cubic centimeters of water samples will be taken from each location to measure and record on-site dissolved oxygen and water temperature. The relevant water samples will then be brought to



水質檢測-泰山區

文/明志科技大學環境與安全衛生工程系 鄂紫綺同學

一、引言

水影響居多事情，不僅僅是民生用水、工業用水、農業種植等用途，包含了街道美觀及生態保育的功用，上述功用都需要乾淨的水來支持，且能有乾淨的水更是得來不易的事，為此本校依環境為主題，檢測位於學校附近的河川水質，以實現USR大學社會責任，並由本校學生協助完成泰山區重點河川水質檢測，透過實踐更讓學生了解水的重要性，且將水質檢測之結果發佈於網路中，供民眾了解泰山區的河川水質情形，使民眾知曉居住環境附近河川水質的情形，達到共同維護河川水質的目的。

二、泰山區的河川

泰山區的河川中我們選擇檢測貴子坑溪、中港大排的不同河段及大窯溪的上下游，共6點採樣點，這些河川中有時會出現大型垃圾，偶爾水面能見度也低，為此我們將各河川分上下游段或者排水口進行採樣，既達到監督的效果亦找尋水質污染的可能原因。

1、中央橋(貴子坑溪)

貴子坑溪時常有大型黑色垃圾袋於溪中，已算是常態出現，從味道及外觀及數據顯示，貴子坑溪為採樣六個點中需特別注意的河川，本校固定採樣監測之時段皆未有發現垃圾傾到之行為，每經過貴子坑溪總是會有難聞的氣味，也知道只靠自己是無法有效維護河川，因此希望透過本次計畫將貴子坑溪水質數據公佈，讓居民一同協助維護貴子坑溪。

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the Department of Safety, Health, and Environmental Engineering laboratory for analysis of other parameters, aiming to understand the pollution conditions of the water systems in Xinzhuang and Taishan. Furthermore, guided by the Environmental Protection Department of the New Taipei City Government, MCUT has formed a water environment patrolling team in Taishan District to conduct patrols along the Gueizikeng River and Dayongkeng River. This patrolling team will conduct 2-3 patrols weekly, filling out observation records and implementing whistleblowing and notification procedures to address suspected pollution cases. In 2022, the university planned to collaborate with the Xinzhuang Water Patrolling Team and include water quality test items in Xinzhuang District. Feedback on the local findings will be provided, and analysis data will be shared with local communities to raise awareness and encourage reflection on water pollution among local residents.

Industry-Academia Research Building Construction Project

To enhance its research and development capacity, MCUT has made arrangements for future applied science and technology development. The university plans to construct an industry-academia research building. According to the regulations specified in the "Standards for Determining Specific Items and Scope of Environmental Impact Assessments for Development Activities" released by the Ministry of Environment, Executive Yuan on August 18, 2020, an environmental impact assessment is required if the cumulative development area is 5 hectares or more since March 2, 2010. From March 2, 2010, to the end of January 2023, the cumulative developed area for the Innovation Building of MCUT is 1.5214 hectares. The planned industry-academia research building construction project covers an area of approximately 1.6763 hectares, bringing the total cumulative developed area to approximately 3.1977 hectares. If the development area reaches 5 hectares in the future, a comprehensive environmental impact assessment will be conducted for the new campus land development project, as required by the "Standards for Determining Specific Items and Scope of Environmental Impact Assessments for Development Activities." This ensures no adverse impact on the biodiversity in the region where the MCUT campus is located.

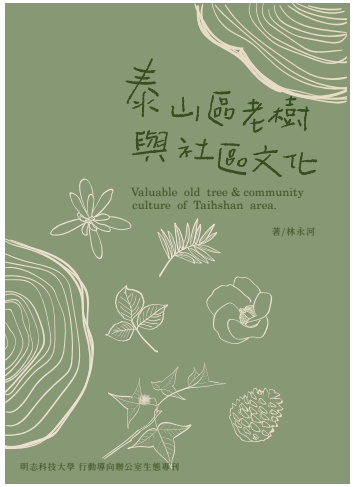


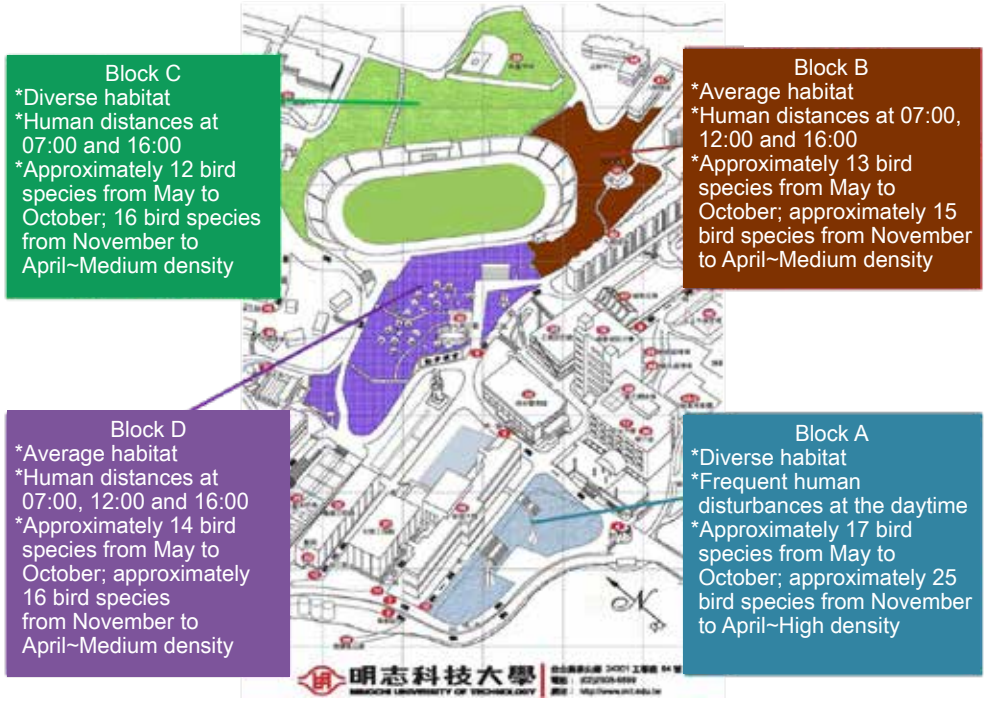


Issuance of Periodicals on Biodiversity

Since 2022, MCUT has collaborated with local middle and elementary schools, Nanya Technology Corporation, community colleges, and NGOs to publish the Annual Report of Environmental Education of Taishan District (renamed to Annual Report of Environmental and Ecological Education of Guanyin Mountain in 2023). Furthermore, MCUT issued two periodicals focusing on the natural ecology in Taishan District in 2019, i.e., Foothills · Ecology-Natural Ecological Resources of Taishan and Valuable Old Tree & Community Culture of Taishan Area. Environmental education has been introduced in detail in Foothills · Ecology-Natural Ecological Resources of Taishan. This periodical also includes a survey of various bird species and their habitats and habits within the campus. Also, the campus is divided into blocks A, B, C, and D, and the birds and human disturbances in these blocks are detailed; in Valuable Old Tree & Community Culture of Taishan Area, the features, application, and characteristics of each old tree in Taishan District are introduced. These periodicals are very helpful for teachers and students to learn about the plants and native species near the campus.







Development of Campus Environmental Education at Elementary and Secondary Schools in Communities

MCUT is located in Taishan District, New Taipei City, near Wugu Industrial Park, Shulin Industrial Park, and small plant areas. This creates an important industrial cluster in New Taipei City. MCUT works with local elementary and secondary schools to promote environmental education. Specifically, MCUT collaborates with Ming Chi Elementary School, Taishan Elementary School, Yixue Elementary School, Tong Rong Elementary School, Taishan Junior High School, Yixue Junior High School, and Taishan Senior High School. The campus covers an area where nearly 70% of the land is hilly or riverine, with dense forest vegetation and winding streams, creating abundant natural ecological resources. MCUT is committed to sustainable environmental development and considers it a mission of the university's social responsibility. Teachers and students engage in activities such as the Tamsui River Waste Fast Screening Survey, Water Quality Survey in Taishan District, and Environmental Education Travel Map, based on environmental surveys, hydrologic and historical context, and environmental changes. Additionally, MCUT collaborates with Hsinchuang Community College, Linkou Community College, the Society of Wilderness Program, the World Association, and Nanya Technology Corporation to collectively reflect on the importance of the natural environment and inspire each other through group discussions.



- We guided relevant personnel from the Linkou Autism Association to learn about chicken farming and taught them methods like vermiculture and aquaponics.



- We introduced and produced kitchen waste compost and Bokashi compost for the community colleges in Taiwan and applied it to the soil.



- Through an education program on the sustainable circulation of net-zero kitchen waste treated using black soldier flies on the elementary school campus, we found that children generally developed a curiosity about Species Recognition and cultivated a sense of responsibility for life and a spirit of not wasting food.





- Map of Environmental and Ecological Education Fields in Taishan District

Aspect	Quantified data	Name of plan	Contents
Environmental Monitoring and Education 	**5** teachers involved Attended by **50** students **30** water environment patrols **24** water quality tests	Water Environment Patrolling Team in Taishan District	We have formed a water environment patrolling team to monitor water quality. We utilize the professional expertise of the Department of Safety, Health, and Environmental Engineering for environmental monitoring and analysis. We have led students to the Taishan region to apply their academic knowledge in practical settings and to encourage their participation and concern for issues related to social citizenship. This initiative aims to foster the students' civic awareness.
	Attended by **40** teachers and students **3** centralized waste hotspots **283.5** km of full-basin survey **800,000** L of waste	Tamsui River Waste Recheck Action	MCUT organized the Tamsui River Waste Recheck Action in cooperation with the Society of Wilderness and Fubon Life. The volunteer team, comprising MCUT teachers and students as well as community residents, visited the Dahan River, Xindian River, Keelung River, Tamsui River, and sea estuaries using green and low-carbon methods like bicycling or hiking.
	3 environmental action plans recorded Attended by **5** elementary and secondary schools Manuscripts provided by **3** group organizations Attended by **13** experts and scholars	2023 Annual Report on Environmental and Ecological Education of Guanyin Mountain	To promote sustainable development, we greatly emphasize collaborating with local partners and schools at all levels to create knowledge-sharing platforms and promote environmental and ecological education. The annual environmental progress report aims to connect local partners and schools with tangible ecological initiatives. This report serves not only as an educational and research outcome but also as a reflection of the combined efforts of partner schools.