# SUSTAINABILITY 2023-2024

## COMMUNICATION ON ENGAGEMENT (COE)

# 6 CLEAN WATER AND SANITATION

## RESEARCH ON REDUCED SDG6

Over the last two years, significant research has addressed various aspects of water quality and environmental challenges in Lebanon and beyond. Studies have explored the water-energy nexus amidst Lebanon's economic crisis, assessed natural mineral water quality in Kesserwan, and investigated advanced nano-composites for wastewater treatment. Researchers have developed methods using shrimp shell waste for cadmium remediation and evaluated environmental risks of natural water sources in South Lebanon. Other studies include assessing surface water vulnerability in India's Mahanadi River Basin, proposing cost-effective solutions for cleaning polluted waterways, and reviewing the properties of fog water. Additionally, research has optimized hospital wastewater treatment, evaluated water quality in South Lebanon, examined dye adsorption using coffee grounds hydrogel beads, reviewed ultrasounds in layered double hydroxides synthesis, characterized groundwater contamination in North Lebanon, and assessed pervious geopolymer concrete for stormwater management. These efforts collectively enhance our understanding of water quality, environmental risks, and innovative water treatment solutions.


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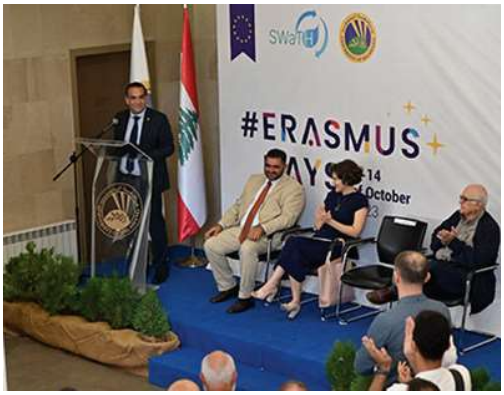
## WATER USAGE AND CARE

The UOB Treatment Plant is located within the University at its northern end and lowest elevation. The selection of this site by the University was in line with the Master Plan, ensuring a downward-inclining location away from existing buildings and facilities. A program of visits or "field day visits" is organized for members of the community, including staff from Municipalities, Ministries and NGO's, together with some engineers, technicians, trainees and students. A primary task is to educate the community about the need for and importance of sewage treatment, as well as the adoption of environmentally-sound practices of recycling such as the re-use of effluent in irrigation. The essential aim of this Treatment Plant is to develop public awareness, leading to people's acceptance of sewage treatment and the beneficial recycling of effluent and sludge.
The undeniable importance and inevitability of sewage treatment is now common knowledge among those responsible, with the result that towns, villages, and Municipalities are currently planning or beginning to implement its adoption.
These programs, combined with visits made by interested parties to our Plant, will help to educate the public generally about the vital need to convert dangerous effluent into a liquid which, when used to irrigate the land, is positively beneficial. The prime duty is the presentation of laboratory analytical data produced regularly on samples collected from the

Treatment Plant, since theoretical knowledge needs always to be scientifically corroborated by analytical data. To this end, a monitoring program has been initiated to generate data on specific parameters that indicate the progress of the treatment process. The treatment process is being carried out in a series of tests conducted on influent and effluent water samples collected. The efficiency of the Plant and its operations and the precision of our measurements are verified by comparison with standard values set by the Lebanese Ministry of Environment (MOE) to check the accuracy of all analytical data produced. Also, the treated effluent is being used for irrigation on the UOB Campus. The areas thus irrigated have displayed good growth when compared with irrigation using University well water.

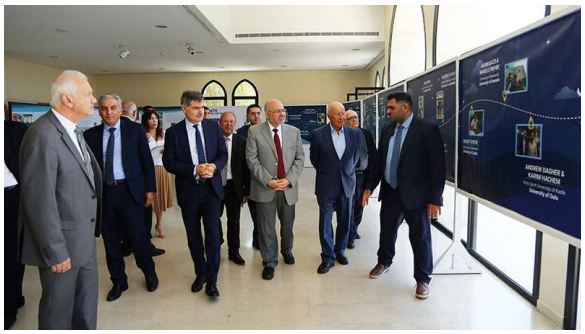
## THE FACULTY OF ENGINEERING AT UOB INAUGURATES THE SUSTAINABILITY WALL

On October 12, 2023, Dr. Elias Warrak, President of the University of Balamand, inaugurated the "Sustainability Wall" within the Engineering Complex at the university's Koura campus as part of the Faculty of Engineering's Erasmus Days 2023 celebration. The celebration was organized by the SWaTH project (The Sustainable Wastewater Treatment for Hospitals), funded by the Erasmus+ program and led by the University of Balamand. Guests at the event included Ms. Alessia Squarcella, representing the European Union Ambassador to Lebanon; Dr. Arif Al-Soufi, the Coordinator of the Erasmus+ Office in Lebanon; and professors, administrators, staff and students. The SWaTH project, managed by Dr. Makram El Bachawati, Associate Professor at the Department of Chemical Engineering, aims to assess the social and environmental impacts of wastewater treatment, foster knowledge exchange between European and Lebanese partners, and enhance the skills of environmental and chemical engineers all while creating opportunities for capacity building in this domain.The day featured a series of activities at the Faculty of Engineering, including laboratory tours and competitions organized by dedicated student volunteers as well as an information session about the next call for Erasmus+ projects delivered by Dr. AlSoufi.

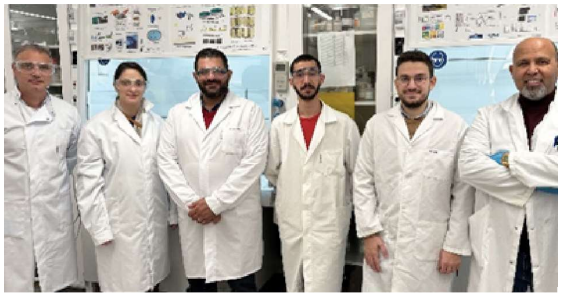
## SWATH PROJECT CLOSING CEREMONY

The Faculty of Engineering at the University of Balamand held the closing ceremony for the SWaTH Project on July 9, 2024, at the Koura campus. The event was attended by notable figures including the Minister of Public Health, Dr. Firas Abiad, and representatives from various ministries, municipalities, hospitals, and partner universities. The SWaTH Project, co-funded by the Erasmus+ Program and managed by Dr. Makram El Bachawati, began in 2020 and focuses on developing sustainable solutions for hospital wastewater treatment. During the ceremony, speakers highlighted the project's achievements and its importance in addressing Lebanon's healthcare and environmental challenges. Dr. Abiad and Dr. Elias Warrak emphasized the need for proper wastewater treatment to protect public health and the environment. Dr. El Bachawati detailed the project's objectives and recommendations. The ceremony concluded with a token of appreciation presented to Professor Rami Abboud for his support and commitment to sustainability.



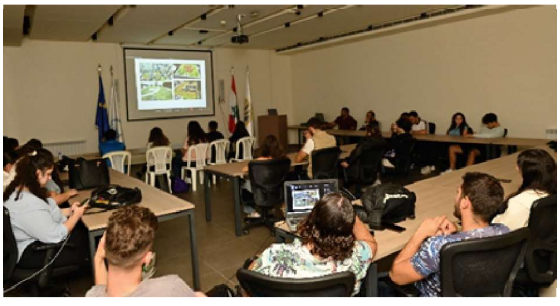

## SOME OF THE PROJECT ACTIVITIES

- Showcase innovative solutions and methodologies for treating hospital wastewater, which are essential for maintaining clean water sources as well as promoting clean water and proper sanitation practices.



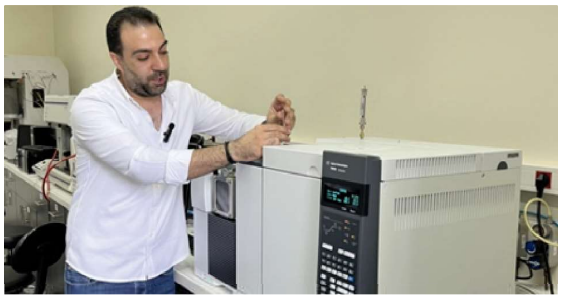
Hands-on experience training at the KTH Royal Institute of Technology (Sweden)

- Celbrate Erasmus Days feature workshops, seminars, and training sessions that enhance the knowledge and skills of participants in sustainable wastewater treatment. These educational activities contribute to improving the quality of education and fostering lifelong learning opportunities.



"Reducing Environmental impact: sustainable green roof technology in the Mediterranean" seminar part of ErasmusDays 2023.

- Establish a leading wastewater analysis center in Lebanon, promote innovation in wastewater treatment technologies, and support the development of hospitals, industries, and municipalities.



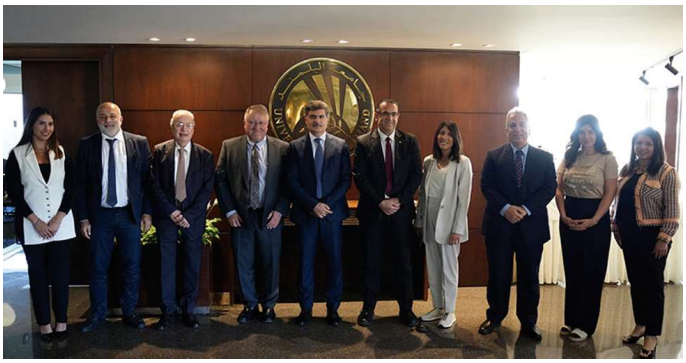
GC/MS Training in the chemical engineering department at the University of Balamand

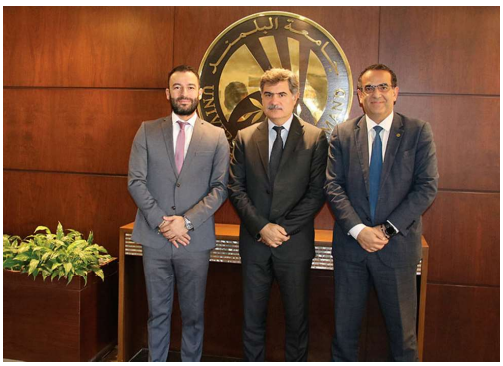
## ENGAGE PROJECT

Under the USAID-funded Water Sanitation and Conservation (WSC) Project, the Faculty of Engineering launched a training program titled "Engage: Capacity Development of Civil Society Organizations to engage in Water and Sanitation." Led by Dr. Yasmine Jabali, the program aims to enhance the capabilities of Lebanese Civil Society Organizations (CSOs) in water and sanitation.
The project involves comprehensive training, knowledge exchange, and implementation of small-scale action plans. The initiative, which has attracted international partners like CEWAS and Ps-Eau, has a total budget of 329,470 USD and will be completed within 14 months. This endeavor underscores the university's commitment to sustainable development and international collaboration in addressing global challenges.

## ENVIRONMENTAL SUSTAINABILITY

Dr. Wael Hamd from the Chemical Engineering Department is dedicated to finding innovative solutions to environmental challenges, focusing on the degradation of microplastics and organic recalcitrant molecules using advanced photocatalytic technologies. His research leverages sustainable nanotechnology methods to develop scalable, eco-friendly practices that reduce environmental impacts and promote long-term sustainability. Key projects include the MAGNO EU Project (2024-2027) aimed at enhancing packaging sustainability in line with the European Green Deal, optimizing water-based drilling mud circulation in deep water (2024-2026) to improve mud pump efficiencies and treat organic pollutants, the LII-CAT Project (2024-2025) for removing organic pollutants from wastewater using advanced oxidation technologies, and a project on using zinc oxide-based photocatalytic reactors for industrial wastewater treatment (2022-2023).





## DEVELOPMENT & ESTABLISHMENT OF A CO-DIPLOMA IN WATER TECHNOLOGY

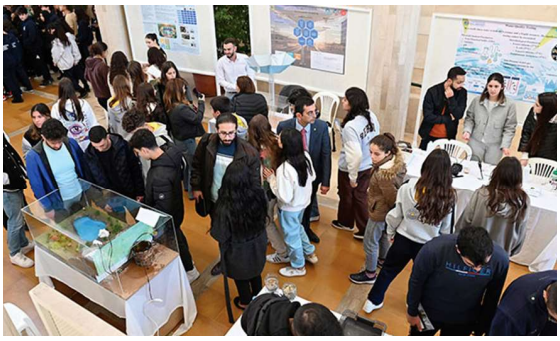
The Issam Fares Institute of Technology and Université de Limoges (France) have established a co-diploma in Water Technology, operational from January 2022. This initiative ensures sustainable water management, addresses water scarcity, and provides quality education through international collaboration.

From 2022 to 2024, the University of Balamand and Polytech Orléans collaborated on a project to study the thermomechanical properties of metakaolin-based geopolymers, advancing sustainable material technology. Between 2023 and 2026, the University of Balamand and Université de la Rochelle are working on developing eco-friendly construction materials to promote sustainable industrialization and reduce waste. The EU-funded WES project, led by Dr. Marianne Saba, addresses marine plastic pollution from 2023 to August 2024, aiming to ensure clean water and promote sustainable consumption. Additionally, the AUF Internationalization Commission fosters international cooperation and partnerships across various fields, including research and education, to reduce educational inequalities.

## ENVIRONMENTAL LEADERSHIP AWARD AT THE MENA


Balamand, November 15, 2023 – The University of Balamand (UOB) was recognized at the inaugural Times Higher Education Awards MENA 2023 in Abu Dhabi on November 14, 2023, for its exceptional Contribution to Environmental Leadership. The event celebrated the achievements of universities across the Middle East and North Africa, with UOB standing out among winners from six countries.
UOB's award was attributed to the Faculty of Engineering's "1 Million Action Postcard" (1MAP) initiative, led by Assistant Professor Dr. Yasmine Jabaly. This project aims to raise awareness and foster positive action on water challenges, gaining significant international support.

## UOB WATER EXPO 2023



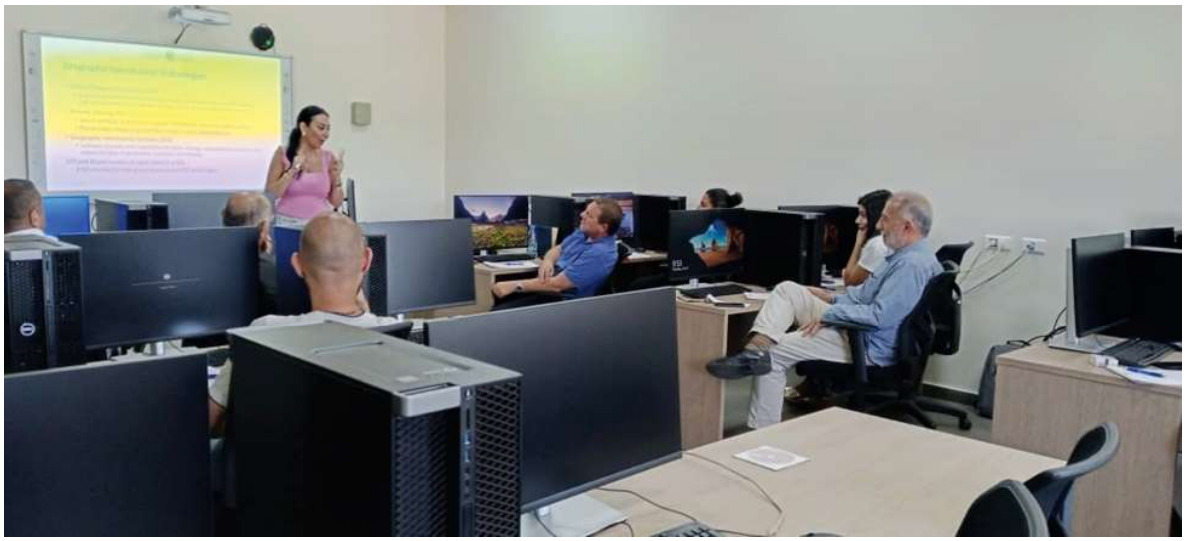
The University of Balamand's Faculty of Engineering hosted the UOB Water Expo 2023 on December 19 at the Hariri Auditorium, Koura campus. The event featured key attendees such as Dr. Nasser Yassin, Minister of Environment (represented by Dr. George Metri), Professor Rami Abboud, and Dr. Yasmine Jabali. The expo primarily engaged over 200 high school students from North Lebanon, emphasizing the importance of water resources. The expo provided an opportunity for future collaboration and knowledge-sharing, aligning with UOB's strategic vision for environmental sustainability. On the other hand, Civil Engineering students organized a presentation for high school students to familiarize them with their design projects addressing water-related issues, aligning with the UN Sustainable Development Goals (SDGs). These activities reflect the vision and ongoing commitment of the Faculty of Engineering to enhance global cooperation and adhere to the UN SDGS, on this occasion, SDG6: Clean Water and Sanitation.

## GIS CENTER:
## CAPACITY BUILDING FOR THE WATER ESTABLISHMENT IN ZGHARTA AND BECHARRI AREA

The University of Balamand recently conducted a comprehensive GIS training program for water establishments in the Zgharta and Becharri areas. This initiative aimed to enhance the capabilities of local water management teams in mapping and analyzing the water network. Here are the key aspects of the training:

### TRAINING OBJECTIVES:

1. Skill Development: Equip participants with the necessary skills to use GIS software effectively.
2. Network Mapping: Enable the creation of detailed maps of the existing water network.
3. Infrastructure Detection: Identify regions that lack adequate water infrastructure and prioritize them for development.



## SUCCESS AT IBDAA 2024:
## STRATEGIC MANAGEMENT STUDENTS SHINE

Undergraduate and graduate students in the Strategic Management courses in Al-Koura and SEG campuses took part in the American University of Beirut's IBDAA 2024 competition. IBDAA chooses one SDG/theme every year and students propose solutions to that issue, showcase it, and compete with other universities. The 1st prize in the Business category was granted to one of our undergraduate student groups.