



SUSTAINABILITY 2023-2024

COMMUNICATION ON
ENGAGEMENT (COE)





12 RESPONSIBLE CONSUMPTION AND PRODUCTION

PUBLICATIONS TOWARD RESPONSIBLE CONSUMPTION

Over the past two years, university researchers have made significant contributions to SDG 12, focusing on sustainable consumption and production. Key studies include the use of recycled materials in concrete, life cycle assessments of hybrid energy systems, and innovative materials for sustainable building performance. Additionally, research has reviewed the environmental impacts of natural water sources, cryptocurrency adoption, and tourism's economic impact. Efforts in sustainable engineering education and eco-friendly construction materials highlight the ongoing commitment to sustainability.

1. Aad, R., El Balaa, R., Tanios, C., & Nemer, N.M. (2024). **Landscape Indicators—An Inventive Approach for the Sustainability of Landscapes.** *Sustainability* (Switzerland). Open access.
2. Abdayem, J., Saba, M., & Aouad, G. (2023). **Elaboration of a sustainable bottom ash geopolymer material.** In *E3S Web of Conferences*. Open access.
3. Abou Rachied, T., Dbouk, F., Hamad, B.S., & Assaad, J.J. (2023). **Structural behavior of beams cast using normal and high strength concrete containing blends of ceramic waste powder and blast furnace slag.** *Cleaner Materials*. Open access.
4. Ahiskali, A., Ahiskali, M., Bayraktar, O.Y., Kaplan, G., & Assaad, J.J. (2024). **Mechanical and durability properties of polymer fiber reinforced one-part foam geopolymer concrete: A sustainable strategy for the recycling of waste steel slag aggregate and fly ash.** *Construction and Building Materials*.
5. Assaad, J.J., & Khatib, J.M. (2024). **Recycled materials used for sustainable pervious concrete.** In *Sustainable Concrete Materials and Structures*.
6. Bassil, C., Harb, G., & Al Daia, R. (2023). **THE ECONOMIC IMPACT OF TOURISM AT REGIONAL LEVEL: A SYSTEMATIC LITERATURE REVIEW.** *Tourism Review International*.
7. Bayraktar, O.Y., Ahiskali, A., Ahiskali, M., Kaplan, G., & Assaad, J.J. (2024). **Feasibility of foam concrete using recycled brick and roof tile fine aggregates.** *European Journal of Environmental and Civil Engineering*.
8. El Hage, M., Louka, N., Rezzoug, S.A., Debs, E., & Maache-Rezzoug, Z. (2023). **Bioethanol Production from Woody Biomass: Recent Advances on the Effect of Pretreatments on the Bioconversion Process and Energy Yield Aspects.** *Energies*. Open access.
9. El Mir, A., Fayad, E., Assaad, J.J., & El-Hassan, H. (2023). **Multi-Response Optimization of Semi-Lightweight Concrete Incorporating Expanded Polystyrene Beads.** *Sustainability* (Switzerland). Open access.

10. El-Chaarani, H., El-Abiad, Z., El Nemar, S., & Sakka, G. (2024). **Factors affecting the adoption of cryptocurrencies for financial transactions.** EuroMed Journal of Business.
11. Fakhreddine, O., Khoury, G., Saber, A., Amer, A.M., & Sabat, M. (2023). **Design and Analysis of a Domestic Device for Converting Waste Cooking Oil to Biodiesel: A Multidisciplinary Study.** In Proceedings - International Conference on Energy Research and Development, ICERD.
12. Frangieh, C., Saba, M., Karmaoui, D., & Lafhaj, Z. (2023). **Sustainability and durability of cracked concrete with geopolymer binder.** In E3S Web of Conferences. Open access.
13. Gerges, N.N., Issa, C.A., Khalil, N.J., & Aintrazi, S. (2024). **Effects of recycled waste on the modulus of elasticity of structural concrete.** Scientific Reports. Open access.
14. Gerges, N.N., Issa, C.A., Khalil, N.J., Abdo, S., & Abdulwahab, Y. (2023). **Flexural capacity of eco-friendly reinforced concrete beams.** Scientific Reports. Open access.
15. Ghali, A.E.A., El Ezz, N.E., Hamad, B.S., Assaad, J.J., & Yehya, A. (2023). **Comparative study on shear strength and life cycle assessment of reinforced concrete beams containing different types of fibers.** Case Studies in Construction Materials. Open access.
16. Jabali, Y., Assaad, J.J., & Aouad, G. (2023). **Photocatalytic Activity and Mechanical Properties of Cement Slurries Containing Titanium Dioxide.** Buildings. Open access.
17. Jahami, A., Chamseddine, F., Salhab, A.A.A., Zaiter, B., & Isleem, H.F. (2024). **Enhancing concrete properties with steel waste: a comprehensive review of GGBS, SS, and steel waste utilization.** Innovative Infrastructure Solutions.
18. Jammoul, M., Semaan, N.M., & Jabali, Y. (2023). **Engineering Laboratories Chemical Waste Management-Introduction of a Web-Based System.** IEEE Engineering Management Review.
19. Khatib, M., Daoud, M., Araiho, W., Saba, M., & Mortada, H. (2023). **Water quality parameters assessment of ras el-Ain natural ponds, tyr, lebanon.** Water Supply. Open access.
20. Khatib, M., Hleihel, J., Araiho, W., Skienhe, H., & Mortada, H. (2024). **Evaluating of the environmental risks of natural water sources in the Alkalaa municipal community area - South Lebanon.** Water Supply. Open access.
21. Kuran, O., & Khabbaz, L. (2024). **Stakeholder dynamics in rural Lebanese women's entrepreneurship.** Journal of Enterprising Communities.
22. Mansour, M., Harajli, H.A., Zakhem, H.E., & Manneh, R. (2024). **Cradle-to-grave life cycle assessment of a photovoltaic–diesel hybrid system: the case of an industrial facility.** Environment, Development and Sustainability.
23. Mardani, A., Hatungimana, D., Yazıcı, Ş., Şahin, H.G., & Assaad, J.J. (2024). **Use of recycled mortar as fine aggregates in pavement concrete applications.** Heliyon. Open access.
24. Marín, C., El Bachawati, M., & Pérez, G. (2023). **The impact of green roofs on urban runoff quality: A review.** Urban Forestry and Urban Greening. Open access.
25. Nakad, M., Gardelle, L., & Abboud, R.J. (2024). **A Systematic Review of the Different Methods Assessing Sustainability Integration in Engineering Curricula.** Sustainability (Switzerland). Open access.
26. Nakad, M., Kövesi, K., Gardelle, L., & Abboud, R.J. (2023). **Engineering Students' Perceptions Towards Promoting Sustainability.** In IEEE Global Engineering Education Conference, EDUCON. Open access.

27. Nasr, Y., Zakhem, H.E., Hamami, A.E.A., El Bachawati, M., & Belarbi, R. (2023). **Comprehensive Review of Innovative Materials for Sustainable Buildings' Energy Performance.** *Energies*. Open access.
28. Nasser Eddine, Z., Barraj, F., Khatib, J.M., & El Kordi, A.A. (2023). **From waste to resource: utilizing municipal solid waste incineration bottom ash and recycled rubber in pervious concrete pavement.** *Innovative Infrastructure Solutions*.
29. Nasser Eddine, Z., Barraj, F., Khatib, J.M., & El Kordi, A.A. (2023). **Volume Stability of Pervious Concrete Pavement Containing Municipal Solid Waste Incineration Bottom Ash.** *International Journal of Pavement Research and Technology*.
30. Oueida, S., Awad, P., & Mattar, C. (2023). **Augmented Reality Awareness and Latest Applications in Education: A Review.** *International Journal of Emerging Technologies in Learning*. Open access.
31. Rishmany, J., & Imad, R. (2023). **Finite Element and Multibody Dynamics Analysis of a Ball Mill Glass Crusher.** *Modelling and Simulation in Engineering*.
32. Saba, M., Arairoy, W., Sabalbal, G., El Bachawati, M., & Absi, J. (2023). **Use of aluminum powder for the development of a sustainable paste used in the restoration of historical monuments.** In *E3S Web of Conferences*. Open access.
33. Saba, M., Pérez, G., Coma, J., & Polls, M. (2023). **Geopolymer as an Innovative Material for Green Roofs- A State-of-the-Art Review.** In *E3S Web of Conferences*. Open access.
34. Tager, E., Naoushi, S.E., Arairoy, W., Saba, M., & El Bachawati, M. (2023). **Aspen Plus designing and optimizing the hospital wastewater treatment by wet air oxidation method.** In *E3S Web of Conferences*. Open access.
35. Yammine, P., El-Nakat, H., Kassab, R., Matar, Z., & Chmayssem, A. (2024). **Recent Advances in Applied Electrochemistry: A Review.** *Chemistry (Switzerland)*. Open access.

INITIATIVES FOR RESPONSIBLE CONSUMPTION

SITE VISITS



The Career Services Center organized successful completion of several site visits from various majors. These visits, spanning Mechanical Engineering, Electrical Engineering, Chemical Engineering, Computer Engineering, Business Administration, Tourism and Hotel Management students, aimed at fostering a deeper understanding of real-world applications in their respective fields. The site visits provided an unparalleled opportunity for students to witness the inner workings of leading companies and industries. By

stepping outside the confines of the lecture hall and into the dynamic environments of Beesline, Inmind, Leo Burnett, Indevco, Ixir, Malia Group, Multilane, Zeeni and Otis, students gained insights into the practical aspects of their chosen fields. For engineering students, these visits offered a glimpse into cutting-edge technologies and innovative solutions employed in industry settings. They were able to see how theoretical concepts translate into tangible products and processes. Similarly, students in Business, Tourism and Hotel Management had the opportunity to observe the operations of successful enterprises, gaining invaluable insights into market dynamics, customer relations, and strategic management.

Beyond acquiring technical knowledge, the site visits served a broader purpose of bridging the gap between academia and industry. Students were able to interact with professionals in their fields, gaining mentorship and networking opportunities that are essential for their professional development. Moreover, witnessing the real-world challenges faced by businesses and industries helped students contextualize their learning, motivating them to strive for excellence in their academic pursuits.



STUDENTS EXCEL IN STRATX SIMULATIONS CIRCULARPRO 2024 COMPETITION

Undergraduate and graduate students from the Strategic Management courses at Al-Koura campus recently participated in the StratX Simulations CircularPRO 2024 competition. This global challenge emphasizes running a business that is not only financially viable but also eco-friendly and sustainable, focusing on sustainable product development and marketing strategies. Impressively, one of our MBA teams achieved a remarkable feat by securing the 16th position out of 238 teams that completed the competition, and 1168 teams that participated worldwide. This achievement highlights our commitment to Sustainable Development Goal 12 (SDG 12) and underscores the importance of integrating sustainability into business education.

COMMITMENT TO SUSTAINABLE AGRICULTURE IN AKKAR

The Career Services Center and MENA Food Safety Associates (MEFOSA) organized a round table discussion on agriculture, food safety, and community development in Akkar campus. The event focused on identifying challenges such as water pollution, high irrigation costs, and the lack of agro-businesses. Opportunities discussed included GIS mapping, the development of a specific agricultural calendar, and the use of advanced technologies like drones and AI. The importance of collaboration between the Ministry of Agriculture, NGOs, and universities was emphasized. Success stories from local agricultural entrepreneurs were shared, highlighting the global potential of Akkar's agricultural products. The discussion concluded with recommendations for creating a machine learning application for the agricultural calendar, demonstrating the university's commitment to sustainable agricultural practices and community development.



MASTERING WASTE MANAGEMENT

On April 4, 2024, the Faculty of Engineering at the University of Balamand hosted a lecture titled "Zero Waste is Not Science Fiction," featuring Engineer Ziad Abi Chaker, CEO of Cedar Environmental L.L.C. Known as the "Master Garbage Man," Eng. Abi Chaker discussed Lebanon's waste management crisis, emphasizing recycling, composting, and proper waste segregation. He showcased projects transforming recycled materials into practical items, highlighting sustainable solutions. Professor Rami Abboud underscored the faculty's commitment to sustainability and announced a student visit to Cedar Environmental. Eng. Abi Chaker was awarded for his contributions to environmental innovation, inspiring future engineers to embrace sustainable practices.



FOE DELEGATION IN MAGNO PROJECT TO PREVENT AND REDUCE PACKAGING POLLUTION

A delegation from FOE, led by Professor Rami Abboud, attended the MAGNO project kick-off meeting on February 6-7, 2024, in Sevilla, Spain. The team, including Dr. Jean Claude Assaf and Ms. Mantoura Nakad, discussed strategies to reduce packaging pollution. As the exclusive Lebanese partner, UOB, funded by the European Research Executive Agency, aims to make significant contributions. Professor Abboud presented UOB's history and research, while Dr. Wael Hamd outlined the project's work package.

