Sustainability Education and Literacy

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SUSTAINABILITY LITERACY

Higher Education Institutions (HEIs) have been incorporating sustainable development (SD) into their curricula, operations, systems, and local communities for over 30 years. UNESCO has further supported this effort through the Higher Education Sustainability Initiative (HESI), encouraging institutions to engage with the UN Sustainable Development Goals (SDGs), particularly SDG 4, which focuses on education. HEIs play a crucial role in promoting sustainability across multiple domains: education, research, campus operations, community engagement, etc... They hold a societal responsibility to guide students, faculty, and staff in promoting sustainability, and their decisions impact the economic, social, and environmental dimensions of their communities, contributing significantly to regional and global sustainability. Nonetheless, despite being at the forefront of these efforts, they encounter significant challenges, particularly when located in Lebanon, where unique contextual difficulties add further complexity. However, the University of Balamand (UOB) boldly embraced these challenges, initiating its journey of commitment to sustainability.

The Faculty of Engineering (FOE) at UoB began this journey in 2022 by undertaking a reflective research analysis to perform a sustainability awareness survey amongst engineering students at FOE to assess the level of sustainability literacy. The outcome of the study confirmed and revealed a serious lack of understanding and awareness amongst students regarding sustainability despite the many projects that are being conducted at UOB (Nakad *et al.*, 2022 & 2023). Knowing that engineers play a crucial role in advancing sustainability initiatives, and for achieving the objectives of the American Board for Engineering and Technology (ABET) re-accreditation in meeting Student Outcomes (SO) 2-4, this necessitated an urgent need to develop a new course focusing on sustainability and its pillars to be integrated in our engineering curricula. A novel course,

GENG222 (renamed to SUST229), was designed in June-August 2023 entitled "Sustainable Development for Engineers" that is being delivered since the Fall Semester of the Academic Year 2023/2024. The course has been included as a core course for all engineering students to take as pre-requisite for their senior undergraduate design projects.

The course's design was pivotal, yielding instant positive outcomes for students' SD education allowing them to choose topics aligned with their interests, thereby fostering commitment to sustainability literacy (click here). Through numerous examples of engineering achievements across all SDGs, students gained confidence and understanding of their crucial role in advancing sustainability, particularly in societal aspects. For the first time, students embraced interdisciplinary collaboration, fostering teamwork with peers from other engineering disciplines to come up with sustainable designs.

The FOE profile in its new sustainability initiative was presented at the Qatar 2023 Expo, acting as a catalyst for promoting sustainable practices within the institution that is situated in Lebanon, a country urgently in need of solutions.

Additionally, FOE's research in engineering education for SD has attracted the eyes of UN-ESCWA, which has decided in July 2024 to follow suit in evaluating the ***sustainability literacy amongst students and faculty members across 9 countries from its memberships***. Thirteen universities, including UOB from Lebanon, were invited to participate in the project "**Regional Assessment of Education for Sustainable Development in Arab Universities**". The findings from this assessment will represent a significant advancement in the UOB's commitment to achieving education for sustainable development. This effort is particularly important given that a recent study (Nakad *et al.*, 2024) found only 32 published articles in the English language worldwide that had assessed SD integration in engineering curricula.

Moreover, and as per the directives of Dr. Elias Warrak, UOB President and council member at UN Global Compact Network Lebanon, the University of Balamand hosted an informative session on the 17 Sustainable Development Goals (SDGs) on July 12, 2024 at the UOB main campus. This session promotes the SDGs within the UOB community, aligning with the university's vision of fostering a sustainable future.

Also, through the Financial Literacy Center, several trainings have taken place to empower the UOB community with essential financial decision making.

There are continuously sessions related to SDG awareness for student through the seminar series such as the green skills for green economy, the 2024 Green Talent Forum, etc.

TRACK OR DEGREE RELATED TO ENVIRONMENTAL SUSTAINABILITY

The Public Health Department offers several undergraduate and graduate courses in relation to environmental management, environmental health, and climate change. A special graduate track within the MPH program exists and focus on environmental and occupational health. https://www.balamand.edu.lb/faculties/FHS/AcademicPrograms/Pages/Programs/MSPublicHealth.aspx

All environmental Sciences courses (EVSC) directly deals with sustainability and/or climate sciences. It is important to note that the sustainability theme is the core of the entire Environmental Sciences undergraduate and graduate programs, and is referred to in almost all the program courses. These courses award qualifications of direct relevance to climate and sustainability officially recognized in BS and MS degrees.

COURSES RELATED TO ENVIRONMENTAL SUSTAINABILITY

ACADÉMIE LIBANAISE DES BEAUX-ARTS (ALBA)

- REGA1202- Architecture Régionale (2 ECTS)
- ARCD1301- Architecture Durable: entrée en matière pour la conception de batiments durables (2 ECTS)
- ATAR1401 - Projet de Construction (8 ECTS)
- ENDU7301- Sustainable Environments/ Environnements Durables (2 ECTS)

FACULTY OF ARTS AND SCIENCES (FAS)

- Environmental Sciences Courses:
    - Undergraduate: EVSC 201, 203, 207, 213, 239, 241, 253.
    - Graduate: EVSC 315, 331, 333, 305, 317, 335.
- Climate science Courses:
    - Undergraduate: EVSC 201, 203, 207, 233, 243.
    - Graduate: EVSC 303, 305, 315.
- Political Sciences Courses: PSIA 215 Citizenship and Democracy, PSIA 217 Negotiation Skills and Conflict Resolution, PSIA 219 Politics of Development and Social Change in Global South, PSIA 233 Human Rights in World Politics, PSIA 253 Media and Society, PSIA 255 Civic Engagement and Community Service, PSIA 254 Society and Gender, PSIA 256 Social Movements and Change, PSIA 257 Social Work, PSIA 260 Social Inequalities and Conflict.
- General Courses: CSPR 211E: Ancient religious and civilizations, CSPR 212E: Christian and Muslim cultures

- Psychology Department and Gender: gender issues directly or indirectly. PSYC214 (Gender identity, social media, and women's self-perception and body satisfaction), PSYC212 (Gender identity, differential psychology related to gender issues, the importance of women (mothers) mental health for child development) , PSYC271 and PSYC340 cover family dynamics and touch on subjects like GBV, single parenting, and women (mothers) mental health as a protective or a risk factor for family functioning and dysfunctioning), PSYC247,249 and 335 deal with psychopathology and mental health issues and touch on subjects related to women's mental health.
    - Mass Communication Department and Gender:
        - MCOM 252 RACE, GENDER AND ETHNICITY IN FILM AND TELEVISION: This course will focus on representation and stereotype in TV and film, tracing the political, economic, and social influences on broadcasting.

FACULTY OF BUSINESS & MANAGEMENT (FOBM)

All management and marketing courses tackle gender equality as part of inclusion and diversity in the workplace.

- MGMT291- Business Ethics and Professional Responsibility (BBA-Undergraduate) Required
- BUSN222- International Business (BBA Undergraduate)- emphasized on Ethics
- EMBA 450- Business Ethics and Sustainability –Required- Assigned projects are related to SDGs.

FACULTY OF ENGINEERING (FOE)

ALL ENGINEERING STUDENTS MUST TAKE THE ENGINEERING ETHICS COURSE AND SUSTAINABLE DEVELOPMENT COURSE FOR ENGINEERS:

GENG221 "Engineering Ethics"

This course introduces and reinforces the concepts, theories, and practice of engineering ethics and aims at providing basic knowledge of ethics for engineers in different types of work roles. It prepares the engineering students for identifying, taking responsibility for, and finding solutions to potential ethical problems/cases. It provides students with an interactive study of ethical theory and the development of professionalism and helps them think more clearly and deeply about ethical issues of the natures that engineers often face in professional practice, and explore resources, strategies, and options for dealing with such complications. Students review case studies of ethical conflicts in engineering practice. The course also covers engineering codes of ethics and requires students to resolve theoretical situations through the application of ethical codes.

GENG222 "Sustainable Development for Engineers"

This course introduces the fundamental concepts of sustainable development. It enhances students' understanding of the UN Sustainable Development Goals (SDGs) and focuses specifically on the critical role of engineers in achieving these SDGs. Students should be able to resolve problems by adopting sustainability principles, which should in turn reflect on the students' design ability to ensure a proper sustainable process to improve and preserve the quality of life for future generations.

CHEMICAL ENGINEERING DEPARTMENT COURSES:

- CHEN299: Introduction to Renewable Energy
- CHEN430: Environmental Design and Life Cycle Assessment
- CHEN589: Waste Treatment Engineering

CIVIL AND ENVIRONMENTAL ENGINEERING DEPARTMENT COURSES:

- CIVE311: Sanitary Engineering (3 credits);
- CIVE318: Environmental Engineering Modeling (1 credit);
- CIVE418: Sewage Treatment Plant (3 credits);
- CIVE520: Principles of Environmental Engineering (3 credits);
- CIVE521: Wastewater Engineering Design (3 credits);
- CIVE522: Water Resources and Water Quality (3 credits);
- CIVE523: Air Pollution Control (3 credits);
- CIVE524: Solid Waste Disposal (3 credits).

Civil and Environmental Engineering Department offers the following courses related to Transportation Sustainability:

- CIVE540: Sustainable Roadway Design, Construction, and Operation (3 credits);
- CIVE541: Contemporary Cities (3 credits);
- CIVE542: Sustainable Development in Transportation Engineering (3 credits); □ CIVE543: Sustainable Development in Civil Engineering (3 credits).

MECHANICAL ENGINEERING DEPARTMENT COURSES:

- MECH290: Introduction to the Engineering Design Process: 2 activities:
- Design of a composting system
- Explication of the 17 Sustainable Development Goals (SDGs) (United Nations)
- MECH389: System Design: sustainability & Environment are considered within design considerations

- MECH419: Renewable Energy Systems: explication of energy consumption and sustainability

FACULTY OF HEALTH SCIENCES (FHS)

- PDHP201 Environment, health, and development 3.0: 3 cr. E
- PDHP 219 INTRODUCTION TO PUBLIC HEALTH 3.0: 3 cr. E
- PDHP 226 SANITATION AND RESOURCE MANAGEMENT FOR PUBLIC HEALTH 3.0: 3 cr. E
- PDHP 227 OCCUPATIONAL HEALTH AND HYGIENE 3.0: 3 cr. E
- PDHP 238 ENVIRONMENTAL MANAGEMENT IN PUBLIC HEALTH PRACTICE 3.0: 3 cr. E
- PDHP 242 PUBLIC HEALTH AND URBAN ENVIRONMENTS 3.0: 3 cr. E
- PDHP 247 ECONOMICS IN ENVIRONMENT, HEALTH AND DEVELOPMENT 3.0: 3 cr. E
- PDHP 249 TOXICOLOGY AND HUMAN HEALTH RISK ASSESSMENT 3:0: 3 cr. E
- PDHP245 Issues in Community Health and Development3:0: 3 cr. E
- MPHP 303 ENVIRONMENTAL HEALTH SCIENCES 3.0: 3 cr. E
- And all the environmental and occupational health track. Link to graduate courses: https://www.balamand.edu.lb/Style%20Library/PDFs/Catalogue/FHSGraduate.pdf#page=15

ISSAM FARES FACULTY OF TECHNOLOGY (IFFT)

MECHATRONICS DEPARTMENT

- MECT329 Renewable Energy (3 credits)

CIVIL AND CONSTRUCTION TECHNOLOGY DEPARTMENT

- CIVT327 Introduction to Environmental Engineering (3 credits). □
  CIVT360 Green Building Rating Systems (3 credits).

AGRICULTURE AND FOOD TECHNOLOGY DEPARTMENT

- AGRT 379 Pest Control (3 credits)
- AGRT 365 Natural and Transformed Ecosystems (3 credits)