SPHERE
Support and Promotion for Higher Education Reform Experts

Funded by the Erasmus+ Programme of the European Union

Greening Palestinian Universities Through Sustainable Engineering, Renewable Energy and Solar Energy Fields

Author: Ahmed Abu Hanieh

ahanieh@birzeit.edu

Higher Education Reform Expert – Birzeit University - Palestine

Introduction

Greening universities means the serious and wide implementation of all processes and techniques that lead to reduce hazards and emissions that harm environment through reaching the needs of the current society in an economic way without damaging the needs of future generations. This makes green body stands on three main pillars: environment, economy and society. It is required to serve the social needs and improve the level of life for people through increasing economic profits and revenues of projects and companies without deteriorating the surrounding environment. This implements the fact that universities should concentrate on increasing their green planted areas and on using sustainable and renewable energy resources to cover their energy needs.

Green Campus

Figure 1: Birzeit University Campus - Palestine

Birzeit University (BZU) standing on a hill with area of 180 acres (720 dunums), most of which are full of trees, is competing to have high ranking in green metric university campus in the region (see Figure 1).

Birzeit University was one of the first educational institutions in Palestine to adopt the principle of green buildings. Its campus has been designed carefully using standards for eco-friendly buildings in order to plant in the hearts of students and staff love, preservation and defense of the land. BZU is focusing on clean renewable energy where it produces about 1.7 MW of electricity using solar energy which is the most available in Palestine. The roofs of different faculty buildings are used to install photovoltaic (PV) solar panels where around 700 kW of electricity is produced by these on-roof solar panels (Engineering, Science, Pharmacy, …). Another 1.0 MW solar PV plant is also installed inside the university to cover the electricity demands of the university and surrounding area.

Sustainable Engineering in Production

Sustainable development is defined as “Meeting the needs of the present without compromising the ability of future generations to meet their own needs”. Sustainable engineering refers to the integration of social, environmental, and economic considerations into product, process, and their design methods. Sustainable engineering requires the consideration of the complete product and process lifecycle during the design phase. The intent is to minimize environmental impacts across the entire lifecycle (that includes material, production, usage and end of life of product) while simultaneously maximizing the benefits to social and economic stakeholders. Sustainable engineering is a way of engineering that meets the needs of the present, preserves the environment, and considers the possible needs of future generations. It requires a lifecycle analysis so you can take into-account not only the immediate costs and effects, but also the resources required to prepare the materials and the resources needed to maintain them. In Palestine with the limited natural resources, human capacity building to use such resources efficiently is of vital importance. Hence human resources will be developed to use the natural resources efficiently on one hand and preserve the environment and improve the employability and standards of living of people on another hand. The mission of the joint Sustainable Engineering in Production Master program launched between Birzeit University and An-Najah University in 2017 aims at contributing in the sustainable development in Palestine, by raising the national industrial quality and production level while preserving the environment and efficiently utilizing resources. This is consistent with the international trends for conserving natural resources, utilizing renewable energy resources, taking into-account water conservation, pollution reduction and implementing Reuse Remanufacture, and Recycle processes. Therefore, the program conforms very well to the principles of sustainability in manufacturing, and production processes in the industrial sectors in Palestine and abroad.

Renewable Energy Management

In the second semester 2020, Birzeit University started teaching in a new Master program called "Renewable Energy Management". The vision of this MA program is creating a qualified generation to operate and manage the local renewable energy resources in Palestine. The continuing shortage in fossil fuel worldwide leads researchers and engineers to go towards renewable energy resources like wind, solar, biogas and others. This fact explores the need in Palestine to create new graduates qualified in operating and managing new startups and renewable energy plants to substitute the deep shortage. The main goal of this program is to supply the local Palestinian market with highly qualified people capable of working in renewable energy projects which conforms with the general guidelines of Birzeit University. The courses of this program encourage students to be involve in modern teaching and learning techniques through considering students the central axis of the learning process enlarging their mental abilities and opening free thinking gates in their ways leading them to participate in society building through innovation and entrepreneurship. By finishing all required courses and thesis successfully, students will gain the following learning outcomes: knowledge and understanding of the theory and applications of renewable energy, wider knowledge and understanding of the requirements to establish renewable energy projects, precise understanding of the basic systems of renewable energy and their applications, Finding typical solutions for the renewable energy problems, general awareness of the impact of social and economic programs on the Palestinian society, understanding the specifications of renewable energy systems and safety rules of operation, predicting future requirements of energy and preparing the necessary plans to satisfy them, ability of automating renewable energy systems through hardware and software, design and planning of renewable energy grids and their security and safety operation, analysis and synthesis of electric networks and using smart ways to function them, adhering to professional ethics in practical life, understanding basics of scientific research and learning scientific writing methodologies and ethics.