M.M. Mohyeldin

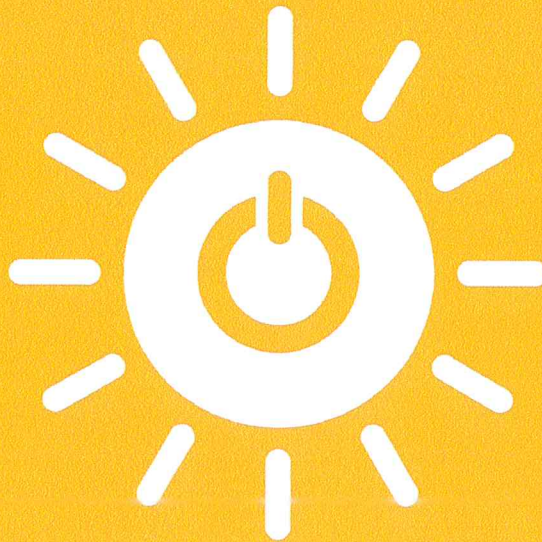**THE IMPACT RANKING**

SDG7

AFFORDABLE AND CLEAN ENERGY

SDG7 Affordable Energy

7.1. Activities

- The Petrochemical Engineering Department (Faculty of Engineering), in cooperation with the PUA student chapter of the Society of Petroleum Engineers (SPE) at the Faculty of Engineering, held a symposium about the future of petrochemicals and chemical engineering on Tuesday, 10 March 2020. The symposium was given by Eng. Karim Ezzat, the Head of the Chemical Engineering Department at the Syndicate of Engineers in Alexandria. Many important topics were discussed in the symposium, including:
  - The relationship between petrochemical engineering and chemical engineering.
  - Job opportunities in the field of petrochemical engineering.
  - The syndicate's services for students.
  - The considerable value of field training for the engineering student.

https://www.pua.edu.eg/the-future-of-petrochemicals-and-chemical-engineering/

7.2. Students projects

Students contributes with the following projects in the filed of energy

Project name	Summary
1. Natural Fibers	The usage of natural resources will play a leading role in the sustainable development of the cement and concrete industry during this century. Plant-based natural fibres are used more increasingly in construction materials. Despite the low-cost of such environmentally friendly renewable material, it has the ability to enhance the mechanical properties of construction materials. This project presents extensive experiments on the use of plant based natural fibres as reinforcement for cement-based composites, with a particular emphasis upon fibre types; fibre characteristic, and fibre-cement composites performance
2. Solar PV pumps for sustainable irrigation in Egypt	This project represents a comprehensive design of photovoltaic water pumping system powered entirely by solar energy with object of conserving electricity by reducing the usage of grid power and conserving water by reducing water losses.

		Proposed system is easy to implement and environment friendly solution for irrigation fields as well as requires minimal maintenance and attention and is self-starting.
3. 4.	Design and optimization of solar collectors' network for swimming pool heating application	This project presents a general procedure for designing and optimizing the arrangement of solar collectors of swimming pool heating applications using TRNSYS software. The optimal arrangement of the solar collectors for thermal applications requires a merge between thermal and hydraulic objectives. For the thermal side, the working fluid must provide the heat load for the swimming pool at the specified temperature also for the hydraulic side the fluid must flow through the system facing a pressure drop within the specified limits. In this project, the overall arrangement of solar collectors which forms the total collector surface area is named by the (solar collector's network). This network will be practically applied on a swimming pool as a case study for this project. In addition to, an experimental model of a solar heater is constructed to fit the swimming pool.
5.	Design, Modeling and performance analysis of solar still	Two identical conventional solar still have been fabricated and will be assembled. For enhancing the freshwater yield, we used some parameters on solar still like a black aluminum sheets fins fixed on a black Basin (steel, 80*50*10 cm, thickness 6 mm). The transparent glass covers of 5mm thickness were placed at an inclination of 30° to the horizontal. Moreover, we used absorbing material like a black dye and sensible heat storage material on different water depth (20mm, 30mm and 40mm). Also, modeling has been carried out aided by some basic and simplified hypotheses, according to overall thermal energy balances on glass, water mass and basin. while taking into consideration an atmospheric condition such as temperatures, humidity, and solar intensity as well as wind speed.
6.	Design and optimization of solar collectors' network for swimming pool heating application	This project presents a general procedure for designing and optimizing the arrangement of solar collectors of swimming pool heating applications using TRNSYS software. The optimal arrangement of the solar collectors for thermal applications requires a merge between thermal and hydraulic objectives. For the thermal side, the working fluid must provide the heat load for the swimming pool at the specified temperature also for the hydraulic side the fluid must flow through the system facing a pressure drop within the specified limits. In this project, the overall arrangement of solar collectors which forms the total collector surface area is named by the (solar collector's network). This network will be practically applied on a swimming pool as a case study for this project. In addition to, an experimental model of a solar heater is constructed to fit the swimming pool.

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9. Smart campus	This project is still proceeding in the academic year 2020/2021 and it aims to construct a smart system for the life of students and staff members in university campus. It helps the education process and provides facilities to check attendance. It also allows students to enter the campus and study rooms with a smart card that can also be used for fees payment.

7.3. Courses in curricula

Faculty	Course name	Course code	SDG-relevancy	Topic
Engineering	Energy Systems	EE 271	7	Studying the availability of using PV arrays in residential & commercial areas
Engineering	Energy conservation	EP 330	7	Different methods of energy conservation: electrical energy conservation, lightening, energy

				saving, heat energy saving, insulation, reusing of hot waste water
Engineering	Renewable energy and storage systems	EM 333	7	Different methods of energy storage systems, : electrical energy lightening, energy saving, heat energy saving, insulation, solar energy, smart building, equipment design, sensors and computer-controlled processes.

7.4. Publications

A New Self-Synchronized Strategy for Grid-Connected Three Phase Voltage Source Inverters
Aboushal, M.A., Moustafa, M.M.Z., El-Gammal, M.A
Alexandria University
Hybrid energy-efficient protocol in delay tolerant networks for IoT systems
Elsaadany, A., Aboulhassan, M.
Pharos University in Alexandria
Performance Analysis and Power Optimization for Spectrum-Sharing Mixed RF/FSO Relay Networks with Energy Harvesting
El-Malek, A.H.A., Aboulhassan, M.A., Salhab, A.M., Zummo, S.A.
Japan University of Science and Technology,King Fahd University of Petroleum & Minerals,Dhahran
The ability of forecasting flapping frequency of flexible filament by artificial neural network
Fayed, M., Elhadary, M., Ait Abderrahmane, H., Zakher, B.N.
American University of the Middle East, Khalifa University of Science and Technology,