



## CENTER OF EXCELLENCE FOR ENERGY (COEE)

### 2023 COE Internship Program

#### - Center of Excellence for Energy Overview:

**Arizona State University** (ASU-US) has established the **Center of Excellence for Energy** (COE) in Egypt with funding and support from USAID. The COE project is a partnership between ASU-US and three Egyptian partner universities (EPUs): Ain Shams University, Aswan University, and Mansoura University. The COE's goal is to improve the capacity of Egypt's higher education institutions to drive public and private sector innovation, modernization, and competitiveness; strengthen government policy to stimulate economic growth; and contribute solutions to Egypt's development challenges in the energy sector.

#### - Internship Program Overview:

Through the Internship Program, student will integrate knowledge and learning from the classroom into practical applications with hands-on experience. Also, it will provide students or recent graduates with the required experience in the industry, allowing to apply the theoretical knowledge gained in the classroom to real-world situations. This experience can be invaluable when seeking full-time employment in the energy sector.

In addition, students will develop professional network within the industry. By working alongside experienced professionals and interacting with other interns, individuals, this can make good connections that may lead to future job opportunities.

Internships in the field can provide students with exposure to different areas of the industry. This exposure can help students determine which area of the industry they are most interested in pursuing as a career. As well as it's useful for gaining practical experience, building a professional network, and exploring different areas of the industry.

#### - 2023 COE Students Internship Program:

No.	Training Topic	Provider	Duration	Period
1	Basic Knowledge of Solar PV Systems Program	Sun Rise + NREA	2 weeks 40 hours	12-8-2023 Sat/Mon/Wed
2	Professional Solar PV Systems Certificate	Sun Rise + NREA	4 weeks 72 hours	12-8-2023 Sat/Mon/Wed
3	Renewable Energy Generation and Management Systems	BEDO	1 week	20-8-2023
4	Hydraulic Power Plants*	Hydro Plants Generation Co. Aswan	2 weeks	29-7-2023
5	PV + Solar Plants*	Hydro Plants Generation Co. Aswan	2 weeks	5-8-2023
6	Energy Plants	Cairo Electricity Company	3 weeks	20-8-2023
7	Power System Simulation for Engineering (PSS/E) Program	Egyptian Electricity Transmission company	2 weeks	30-7-2023

\* Travel and Accommodation are included

The Center of Excellence for Energy will cover all the costs related to the training.



### - Eligibility Criteria:

Students enrolled in an energy-related Program at the three Egyptian Universities members of the Center of Excellence can apply for these internship opportunities. The three Universities are:

- Ain Shams University, Faculty of Engineering
- Mansoura University, Faculty of Engineering
- Aswan University, Faculty of Engineering and Faculty of Energy

Eligible Study Levels:

- Promoted to Second year / Junior.
- Promoted to Third year / Senior-1
- Promoted to Fourth year / Senior-2

[Apply Here](#)

The form should be divided into the following sections:

1. Personal Information (Name, Email, Mobile, National ID).
2. Academic Information (University, Faculty, Program, Level, Student ID, cGPA).
3. Selection of the three preferences among the internships list.
4. Uploaded files (National ID, Transcript)

**Deadline: Thursday 20<sup>th</sup> of July at 11:59 pm.**

- Selection Criteria: Higher Levels then Higher cGPA.
- Accepted students will be notified and reached through the COE internship program.
- Internship accomplishment certificates will be given and delivered once completed.



## 1. Basic Knowledge of Solar PV Systems Program (Sun Rise + NREA)

Location: New and Renewable Energy Authority. Address: Dr. Ibrahim Abo Elnaga St., Ex. of Abbas El-Akkad St., Nasr City, Cairo.

### **Program Objectives:**

By the end of the course, the participants will be able to:

- Differentiate among different solar energy applications
- Identify the appropriate PV system components
- Understand applicable rules, regulations and standards on Solar PV projects
- Estimate the project feasibility along its life time
- Start and develop solar PV business and projects

### **Program Outlines**

1. Solar energy applications
  - Solar water heating applications
  - Solar PV applications (on-grid and off-grid)
2. Solar radiation
  - Solar radiation characteristics
  - Orientation angles
  - Radiation data
3. Renewable Energy in Egypt
  - Renewable Energy development worldwide and in Egypt
  - Regulations of renewable energy in Egypt
4. Solar PV system components
  - PV modules and inverters
  - Mounting structure
  - Cables, protection and accessories
5. Solar PV systems economics and feasibility analysis
  - Solar PV projects economic indicators
  - Time value of money
  - Project feasibility calculations (ROI, Payback and LCOE)
6. Solar PV Business Start-up & Development
  - Overview on Solar PV market in Egypt
  - How to start new Solar PV business
  - Business development, marketing & sales



## 2. Professional Solar PV Systems Certificate (Sun Rise + NREA)

Location: New and Renewable Energy Authority, Nasr City, Cairo.

### **Program Objectives:**

By the end of the course, the participants will be able to:

- Differentiate between different solar energy applications.
- Understand the solar radiation and apply it in design and installation.
- Define the appropriate PV system according to customer requirements.
- Select and match the appropriate system components.
- Design complete Solar PV systems (On-grid, Off-grid & solar pumping).
- Simulate the PV system on simulation software and analyze the results.
- Apply applicable rules, regulations, and standards on Solar PV projects.
- Estimate the project's feasibility along its lifetime.
- Start and develop solar PV business and projects.

### **Program Outlines**

1. Renewable Energy in Egypt
  - Renewable Energy worldwide
  - Renewable Energy development in Egypt - Regulations of renewable energy in Egypt
2. Solar radiation
  - Solar radiation characteristics - Solar angles optimization -
  - Shading analysis - Radiation data
3. Solar PV system components selection
  - PV modules - Inverters - Cables, protection devices and accessories
4. Solar PV on-grid system design
  - Consumption estimation - PV system sizing - Selection of on-grid inverter
  - System configuration - Mounting structure layout planning - Cables and protection
5. Solar PV systems economics and feasibility analysis
  - Solar PV projects economic indicators - Time value of money
  - Project feasibility calculations (ROI, Payback and LCOE)
6. Solar PV software simulation
  - Complete system simulation on PVSOL/PVSyst
7. Solar pumping system design
  - Pumps types - Pump sizing - Solar PV system design and configuration
8. Solar PV off-grid system design
  - Loads calculation - Solar PV system design and configuration
  - Inverter and charge controller selection - Battery sizing and configuration
9. Solar PV Business Start-up & Development
  - Overview on Solar PV market in Egypt
  - How to start new Solar PV business - Business development, marketing & sales
10. Final evaluation
  - Final project presentation - Final test



### 3. Renewable Energy Generation and Management Systems (BEDO)

Location: The Egyptian Company for Developing Education Technologies (BEDO), 6<sup>th</sup> of October City

Day	Date	Content
Sunday	20/8	Introductory & Exploratory tour inside the factory and production lines HR lecture & Industrial Safety lecture
Monday	21/8	Practical training in R & D centers and production Lines (Specialized Training)
Tuesday	22/8	Practical training in R & D centers and production Lines on renewable energy management systems BEDO Renewable energy management systems
Wednesday	23/8	Practical training in R & D centers and production Lines on energy management systems produced from solar cells using BEDO PV Cells Training System
Thursday	24/8	Ending the training period as follows: <ul style="list-style-type: none"><li>• An introductory lecture on how to enter the labor market and the most important platforms for job advertisements.</li><li>• An introductory lecture on the most important skills required in the labor market.</li><li>• An introductory lecture on how to write a professional VC Lecture on how to pass the Interviews successfully.</li></ul>



4. Hydraulic Power Plants (Hydro Plants Generation Co. Aswan)

Location: Aswan Training Center.

Day	Date	Content
Saturday	29/7	ATC presentation Types of power stations Renewable Energy Types Main Components of Hydroelectric Power Plants
Sunday	30/7	Basic Hydraulic & Control Hydraulic Circuits & Hydraulic Control Lab
Monday	31/7	Turbine Gates Types of Pumps and Pump choice Pump Lab
Tuesday	1/8	Hydraulic turbines Advanced Operation and Maintenance of Hydraulic Turbines Hydraulic turbines Lab
Wednesday	2/8	Generators Lab Transformers Lab Transformer Oil Analysis
Thursday	3/8	Simulator (Operation & Faults)
Saturday	5/8	High dam on job training
Sunday	6/8	High dam on job training
Monday	7/8	Aswan I on job training
Tuesday	8/8	Aswan II on job training
Wednesday	9/8	Solar energy on job training (Benban)
Thursday	10/8	CV- Interview Closing ceremony



5. PV + Solar Plants (Hydro Plants Generation Co. Aswan)

Location: Aswan Training Center.

Day	Date	Content
Saturday	5/8	ATC presentation Types of power stations Renewable Energy Types Main Components of Hydroelectric Power Plants
Sunday	6/8	Types of solar systems (On Grid - Off Grid- Hybrid)
Monday	7/8	Types of solar cell and its properties, efficiency, and read data sheet of solar P.V cell. Connection of P.V cell I-V curve of P.V cell
Tuesday	8/8	Types of inverters and their properties, efficiency, and read data sheet of inverters. Types and connection of battery in solar system Charge controller Types of DC/AC cables in PV system
Wednesday	9/8	Heating in solar system Pumping system in solar station Types of pumps in solar system
Thursday	10/8	Calculation of OFF grid to design OFF grid station. Design ON grid station Design of heating with solar system Design of irrigation pumping with solar system
Saturday	12/8	High dam on job training
Sunday	13/8	High dam on job training
Monday	14/8	Aswan I on job training
Tuesday	15/8	Aswan II on job training
Wednesday	16/8	Solar energy on job training (Benban)
Thursday	17/8	CV- Interview Closing ceremony



6. Energy Plants (Cairo Electricity Company)

Location: North Cairo Training Center

Day	Date	Content
Sunday	20/8	Introduction to Energy and Energy Conversion Types of Power Plants Power Plants Overview – Single Line Diagram
Monday	21/8	Thermal Power Plant (Steam – Gas – Combined)
Tuesday	22/8	Pumps, Fans, Air compressors
Wednesday	23/8	Visit to Cairo North Power Plant (Component – Operation)
Thursday	24/8	Mechanical seal, Heat Exchanger
Sunday	27/8	Main components of Electrical networks: Generators.
Monday	28/8	Main components of Electrical networks: Transformer, Transmission Line.
Tuesday	29/8	UPS and Batteries
Wednesday	30/8	Visit to Shoubra El-Kheima Power Plant (GIS - Switch Yard – Circuit Breaker and SF6)
Thursday	31/8	Energy Rationalization and Power Factor Improvement
Sunday	3/9	Introduction to Automatic Control PLC Control
Monday	4/9	Electrical Machines
Tuesday	5/9	Power system protection. Current and voltage Transformers
Wednesday	6/9	Visit to Cairo West Power Plant (PLC-DCS-SCADA Control room)
Thursday	7/9	Test and Closing



7. Power System Simulation for Engineering (PSS/E) Program (Egyptian Electricity Transmission Company)

Location: Financial and Administrative Training Center

PSS/E program, “Power System Simulator” used by the Electricity companies in many countries including Egypt to simulate their national electrical grid with different components.

Day	Date	Content
Sunday	30/7	Introducing the PSS/E program and the set of functions it performs, including power flow analysis.
Monday	31/7	Power flow in electrical grid
Tuesday	1/8	Types of power flow studies
Wednesday	2/8	<ul style="list-style-type: none"> <li>• Data requirements</li> <li>• Outputs from the program</li> <li>• The most important files within the program that deals with.</li> </ul>
Thursday	3/8	<ul style="list-style-type: none"> <li>• Automatic operation of the Program</li> <li>• Windows properties of PSS/E</li> </ul>
Sunday	6/8	Representation of grid components and their characteristics
Monday	7/8	Representation of bus bars and their properties
Tuesday	8/8	Representation of generator and its properties
Wednesday	9/8	Representation of loads with different types and characteristics
Thursday	10/8	Case Study: representation and operation of a simple grid.