

**Exciting Training Opportunity for Graduates and Professionals**

**Energy Fundamentals Course Outline**

**Jointly facilitated by BUET, USAID and NREL**

**Learning Outcomes:**

After completing this course, the participants will be able to:

* Understand how present and future energy systems are designed, including their main components.
* Obtain a basic understanding of energy transmission and distribution, energy planning, urban planning and community engagement, oil and gas pipelines, nuclear power, energy modeling tools, building energy consumption, clean/green solutions, and net-zero/low-carbon scenarios.
* Learn the principles and the technologies that are used to harness energy from renewable resources. Learn about the principles and applications of wind turbines, solar arrays, fuel cells, hydrogen energy, and biomass.
* Attain knowledge on the long term economic and social benefits of well-planned energy systems as well as a discussion on development challenges.
* Supervise sustainable energy development projects in cooperation with public or private sectors.
* Identify the financial issues of a project and gain the skills to analyze and solve engineering problems with cost-effective solutions.
* Identify the energy efficiency needs of a smart building in the industrial or commercial sectors, and the required standardizations and certifications needed (if any).
* Develop an awareness of the various energy and economic modeling tools available to industry, non-governmental organizations (NGOs), and governments to make informed decisions.
* Identify the impacts of different energy resources and technologies on the environment and climate change at both local and global levels.
* Develop the ability to fully understand energy policy statements (and their implications) and predict upcoming needs and trends in an energy transition future.

**Tentative Course Outline (8 hours per day):**

| **Day** | **Class** | **Topic** | **Hours** | **Speakers** |
| --- | --- | --- | --- | --- |
| 1 | 1 | Energy Basics | 1.5 | Dr. M. Tamim, PMRE  Dr. Farseem M., IESD |
| Bangladesh Energy Landscape | 1.5 | Dr. M. Tamim, PMRE |
| 2 | Gas: Bangladesh Perspective | 1.5 | Dr. M. Tamim, PMRE |
| Petroleum | 1.5 | Dr. Mahbubur Rahman, PMRE |
| 3 | Gas & Oil Pipelines | 1 | Dr. Mahbubur Rahman, PMRE |
| Electricity Grid | 1 | Dr. Abdul Hasib Chow, EEE |
| 2 | 4 | Solar Energy: Bangladesh Perspective | 3 | Dr. Ziaur Rahman Khan, EEE |
| 5 | Wind Energy | 1 | NREL |
| Biomass Energy | 1 | Dr. Md. Obaidullah, IESD |
| Nuclear Power | 1 | Dr. S. Fattah, EEE |
| 6 | Energy Storage | 1 | NREL |
| Electric Vehicles | 1 | NREL |
| 3 | 7 | Energy Efficiency in Buildings | 2 | Dr. Md. Zahurul Hoque, ME |
| Energy in Urban Planning | 1 | Dr. Sabbir, ARCH |
| 8 | Energy Economics | 1.5 | USAID-BADGE |
| Energy Modelling | 1.5 | USAID-BADGE |
| 9 | Energy Management | 1 | Dr. Iqbal Hossain, ChE |
| Energy Security & Resilience | 1 | NREL |
| 4 | 10 | Energy Project Financing | 1.5 | IDCOL |
| Clean Energy Project Development  (Case Studies) | 1.5 | USAID-BADGE |
| 11 | Energy and Gender | 1 | Dr. Celia Shahnaz, EEE |
| Energy and Climate | 1 | USAID Bangladesh |
| Energy Transition | 1 | Dr. Farseem M., IESD |
| 12 | Bangladesh Energy Future | 1 | USAID-BADGE |
| Knowledge Check | 0.5 | IESD |
| Certificate and Closing | 1.5 | VC, pro-VC and USAID officials |

**Evaluation of Participants for Awarding Certificates**

The certificate will be accompanied with a ‘grade’ that may not be a letter-grade but more qualitative – e.g., Excellent, Very Good, Satisfactory. However, the participants will have to ‘earn’ the grades. A minimum of presence of 50% will be required to earn the certificate in the first place. The lectures will assume basic knowledge of engineering and science. The level of the classes would be 2-plus level courses (sophomore) that we take in undergraduate classes.

**Instructors**

The instructors for this certificate course are reputed energy experts from BUET, USAID/Bangladesh, USAID-BADGE and NREL. They have significant experience in the energy industry. The instructors will provide the PowerPoint slides of each lecture. The instructors can suggest reading assignments and take-home exercises but won’t grade them. They will collectively help formulate the test questions.