Renewable Energy Technology
Mid Term Assignment
Spring 20-21

Last date of submission: 13.03.21

1. When installing a fixed flat-panel collector on a roof in Sylhet city (24.8949° N, 91.8687° E), what orientation (azimuth and tilt) should be chosen to maximize the total energy harnessed over the year?

2. Calculate the maximum and minimum solar elevation angles for Dhaka (23.8103° N, 90.4125° E).

3. What is the angle of incident of solar radiation on a horizontal surface at solar noon in Khulna city (22.8456° N, 89.5403° E) on the **A**th of July?

A should be the first 2 digits of your ID. (eg. if your ID is 18-78253-2 then A = 18)

4. What is the local solar time when it is 10h00 on the clock in Liverpool (53°N, 3°W)? Liverpool uses Greenwich Mean Time with the standard time zone meridian at 0°W. Daylight saving time is not in effect in winter.

Here, Gregorian Calendar Day (n) should be the last 2 digits of your ID. (eg. if your ID is 18-78253-2 then n = 32)

5. Calculate the position (azimuth, elevation) of the Sun at 15h30 on the clock in Istanbul (41°N,28°E). Istanbul uses Eastern European Time, with the standard time zone meridian at 30°E. Daylight saving time is in effect (summer time is one hour ahead of winter time).

Here, Gregorian Calendar Day (n) should be the last 2 digits of your ID. (eg. if your ID is 18-78253-2 then n = 32)

6. If the dark saturation current of a solar cell is $1.7 \times 10-8 A/m^2$, the cell temperature is 27°C, the short-circuit current density is $250 A/m^2$, and the voltage at maximum power is 0.47V, calculate the open circuit voltage, V_{oc}; current density at maximum power, I_{max}; maximum power, P_{max}; and maximum efficiency, η_{max}. What cell area is required to get an output of 20 W when the available solar radiation is $820 W/m^2$?

Instructions:

1. Assignment should be Handwritten.
2. Scan the assignment using suitable mobile scanner (cam scanner, adobe scanner etc.) and make it as pdf file.
3. Rename the pdf file name with your ID.
4. You can only submit one single pdf file.
5. Copied/identical submissions will be graded as 0.

The deadline for submitting this assignment is 13th March 2021 (Saturday) until 11:59 pm. Please prepare your assignment and submit it in Microsoft teams within this deadline.