



## IEM Leads Renewable Energy STEM Initiative for Secondary School Students

By

Ir. Ts. Aion Shakila Shamsuddin

A committee member of E2TD Session 2026/2027

The Institution of Engineers Malaysia (IEM), through its Engineering Education Technical Division (E2TD), successfully organised a half-day STEM Outreach Programme hosted at UOW Malaysia's Glenmarie Campus. This event marked a significant effort in promoting engineering awareness and hands-on learning among secondary school students. A total of 153 students from SMK Damansara Utama, SMK Sri Andalas, SMK USJ 8, and SMK Subang Utama participated in this experience, which focused on the construction and testing of a DIY solar-powered car. Ir. Aion Shakila, Ir. Zainon Sharmila, Ir. Rajasegaran and Ts. Nur Hassali from E2TD facilitated the entire programme, ensuring that students enjoyed a meaningful, engaging, and enriching learning journey.



**Figure 1: Briefing Session and E2TD-IEM Facilitators**

The event began early in the morning with the arrival of students at 8.30 am. Upon reaching the campus, the students proceeded to the registration area where they were greeted warmly by both the IEM engineers and UOW Malaysia staff. Registration was conducted smoothly, supported by colour-coded tags which helped divide students into their respective groups. Following registration, the students were ushered into the main lecture theatre for a short briefing session. During the briefing, representatives from UOW Malaysia welcomed the participants, after which Ir. Raja introduced the role of IEM and its Engineering Education Technical Division. Ir. Aion then provided an overview of the day's activities. To ensure effective facilitation, the programme was divided into two main sessions. Each session featured the same set of activities but allowed smaller groups of students to participate in a more focused setting.

Session 1 commenced after the morning briefing, involving around half of the total participants. The session began with an introduction to renewable energy, where the facilitators explained the basic principles of solar energy and how it can be harnessed through photovoltaic panels. This was followed by an introduction to the components of the solar-powered car kit. The students were guided through the function of each component, such as the solar panel, DC motor, chassis, axles, wheels, and wiring. For many students, this was their first time handling electronic components, which made the hands-on session both exciting and challenging.

During the hands-on activity, the students worked individually. They carefully assembled their cars under the supervision of the IEM engineers. The process demanded significant attention to detail: the alignment of the wheels had to be precise to ensure smooth movement, wiring had to be connected correctly to allow proper power flow, and the overall structure of the car needed to be stable enough to withstand motion. The engineers walked from one group to another, offering support whenever students encountered difficulties, particularly in the wiring segments or mechanical balancing.



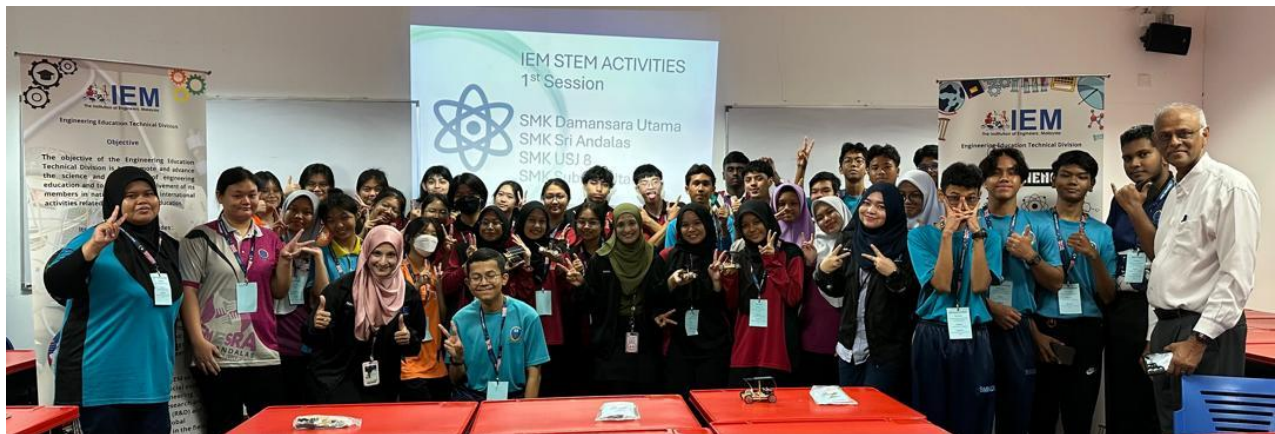
**Figure 2: Workshop photos from Session 1 and Session 2.**

After the construction phase, the students proceeded to the testing stage. The cars were tested using a battery. This stage taught students the importance of troubleshooting, as many groups had to adjust their designs due to issues such as misaligned wheels, unstable chassis, or motors that failed to spin due to reversed polarity. Through trial and error, teams learned to modify and improve their designs, which enhanced their critical thinking skills.

The evaluation criteria included the ability to assemble the car quickly with good structural stability, its movement speed, and its overall performance. At the end of the session, three winners were announced: Alif from SMK Sri Andalas won first place, followed by Lee Jye Ni from SMK USJ 8 in second place, and Tan Shi Hui, also from SMK USJ 8, earning third place. Their achievements were celebrated with a prize-giving ceremony, applause, and photographs, marking a successful end to the first session.



**Figure 3: Winners for Session 1**



**Figure 4: Group photo taken at the end of Session 1.**

The second session began immediately after the first session was completed, with each session lasting one and a half hours. All procedures from the earlier session were repeated. Once again, three top performers emerged. First place was awarded to Fakhru from SMK USJ 8, while second place went to Lew Jun Qi, also from SMK USJ 8. The third place prize was earned by Amir, another student from the same school. The success of these students highlighted the high level of enthusiasm and teamwork demonstrated throughout the session.



**Figure 5: Winners for Session 1**



**Figure 6: Group photo taken at the end of Session 2.**

Across both sessions, the programme successfully delivered a rich educational impact. Students not only learned about renewable energy concepts but also gained hands-on experience with simple circuits and mechanical assembly. Teachers accompanying the students praised the structure of the workshop and appreciated the opportunity for their students to engage with practising engineers. They noted that such experiences can significantly motivate students to pursue STEM-related careers in the future.



**Figure 7: Students with their completed solar-powered car**

The success of the programme suggests promising directions for future events. For instance, IEM may consider offering advanced engineering kits, such as mini-robots or wind turbine models,

to further enhance students' exposure to engineering concepts. Additionally, establishing a follow-up interschool competition could sustain the students' long-term interest in STEM activities.

In conclusion, the STEM Outreach Programme at UOW Malaysia Glenmarie Campus was highly successful, providing students with valuable hands-on exposure to renewable energy and engineering concepts. Their enthusiasm, combined with strong guidance from IEM engineers, created an engaging and impactful learning experience.