TECHNICAL VIDEO

THEME

Synergising Chemical Engineering and Sustainable Microelectronics for a Greener Future

THEME DESCRIPTION

The microelectronics industry is the foundation of modern technology, powering essential devices from smartphones to advanced computing systems. Nonetheless, this advancement has incurred considerable environmental expenses. As the demand for more powerful and efficient microelectronics increases, so too does the energy consumption, resource depletion, and development of electronic trash (e-waste) linked to their manufacturing.

Microelectronics manufacturing, particularly semiconductor fabrication and nanomaterial synthesis, is among the most resource-intensive industrial processes, consuming significantly more energy than conventional material processing. The business significantly relies on essential raw minerals like gallium and indium, which are at risk of supply constraints within the next two decades due to increased demand and limited natural reserves. The improper disposal of microelectronic components, including printed circuit boards and semiconductor chips, contributes to environmental pollution and potential emissions from hazardous substances, with global waste projections reaching 74.7 million metric tonnes by 2030.

The production of microelectronics has considerable environmental consequences, including resource extraction, high energy consumption, and toxic emissions. Semiconductor etching, an essential process, depends on fluorinated gases such as CF_4 and NF_3, which possess significant global warming potentials. It also generates wastewater pollutants, including PFAS, which threaten water quality and public health. The escalating problem of e-waste underscores the necessity for more sustainable procedures in microelectronics industries.

The theme, "Synergising Chemical Engineering and Sustainable Microelectronics for a Greener Future," underscores the vital contribution of chemical engineering to promoting sustainability in the microelectronics sector. This theme promotes the integration of chemical engineering concepts with advanced green technologies, urging participants to create new, environmentally friendly solutions that mitigate environmental damage, enhance resource circularity, and foster a sustainable, low-carbon future. By addressing these challenges, this theme aligns with key Sustainable Development Goals (SDGs), including SDG 9 (Industry, Innovation, and Infrastructure), SDG 12 (Responsible Consumption and Production), and

SDG 13 (Climate Action), fostering a more sustainable and responsible future for the microelectronics industry.

Key focus areas include:

- Identifying and creating safer, sustainable alternatives to hazardous compounds in microelectronics manufacturing, thereby mitigating toxicity and environmental dangers.
- Developing and implementing energy-efficient and low-carbon manufacturing techniques that optimize resource utilization, minimize emissions, and enhance overall efficiency in microelectronics production..
- Implementing effective recycling and resource recovery systems to recover valuable materials, prolong the lifespan of microelectronic components, and advance towards a circular economy.

This theme utilises chemical engineering expertise to push participants to devise practical and significant ways that integrate sustainability with technological progress. By integrating chemical engineering with sustainable microelectronics, we can create a more environmentally responsible future for the microelectronics sector.

OBJECTIVES

- Encourage participants to brainstorm creative and innovative ideas on a given engineering issue that contribute to the future of the community and the world.
- Provides a platform for participants to demonstrate their expertise, originality and critical thinking skill.
- Provide opportunities to participants who are future chemical engineers to showcase their problem-solving skills and insights on the ideas present in the video and also video editing skills.

COMPETITION DESCRIPTION

- This is a **GROUP** competition with **THREE (3)** participants per team, and will be conducted via **ONLINE**.
- Each university/institution may enroll a maximum of **FIVE (5) teams** in this competition.
- Technical Video Competition encourages teams to present their idea in maximum **FIVE (5) minutes.**
- Each team should create content that creatively aligns with the specific theme provided by the organiser.

- The submitted video must comply with the theme and rules of USM NACES 2025.

ELIGIBILITY

- For group competition, **ALL** participants must be full-time undergraduate students. At least **TWO (2)** participants must be full-time **undergraduate students** enrolled in the **Chemical Engineering Program** (or equivalent) offered by one of the participating universities/institutions.
- Participants must submit an **APPROVED** original copy of their **student identity card (Matric Card)** together with the **LATEST module registration file**.
- Each participant is only allowed to participate in **ONE (1) physical mode competition** and **ALL online mode competitions**.
- Each participant in a team must be from the **SAME** university/institution.

FORMAT

- **Video Guideline**:
  - Language of video content: **English**
  - The maximum length of the video: **5 minutes**
  - The videos must be in **MP4 or WMV format.**
  - The resolution must be at **minimum 1280 x 720 (720p)**
  - Introduction must include:
    - Title of Video
    - Name of University/Institution
    - Team Name
    - Name of Each Participant
  - Conclusion must include:
    - References **(APA 7th reference style)**
- **Summary Guideline**:
  - A summary of not more than **250 WORDS** regarding the video should be attached along with the video submission together with the cover page (refer to the submission format).

- **Cover page**:
  - A cover page must be included in the **beginning of the video as a thumbnail** and the cover page (thumbnail) must also be submitted separately in **pdf form during video submission via email.**
  - Cover page should include:
    - Title of Video
    - Name of University/Institution
    - Full Name and Identity Card Number (Malaysian) or Passport Number (Non-Malaysian) of Each Participant (The name of the team leader should be placed first followed by members in alphabetical order)
    - Course or Program Enrolled in by Each Participant
    - Team Name
    - Contact Number and Email Address of Each Participant (The name of the team leader should be placed first)
- Briefing session will be on **18 October 2025**.

RULES AND REGULATIONS

- Each university/institution is entitled to send a maximum of **FIVE (5) teams**.
- Each team must consist of a maximum of **THREE (3)** members.
- Each team is entitled for **ONE (1)** submission only.
- The submitted work must be of original work. Plagiarism is **STRICTLY PROHIBITED**.
- Political and '3R'- Race, Religion and Royalty contents are **NOT ALLOWED.**
- Decisions by judges are **FINAL** and **NOT** open to appeal.
- Late submissions will not be entertained under any circumstances.
- Entries which do not comply with any of the rules and video guidelines stated will be **AUTOMATICALLY DISQUALIFIED .**
- Upon submission, any modification on the contents is not allowed. Evaluators have the right to penalise the participating team for the change of contents.

SOFT COPY OF VIDEO SUBMISSION

Video Submission Guideline:

- Video submission deadline: **15 November 2025**

- Submissions can only be made **6 days** before the submission deadline: **10 November 2025 - 15 November 2025.**
- Upon the video submission, any modifications to the video contents are not allowed. Judges have the right to penalise participating teams for the change of content.
- All entries must be submitted in **PDF format** and **MP4/WMV format** (via email) before the video submission deadline.

Submission Format via email:

- To : regnaces.usm@gmail.com
- Email Subject : [TVC]_Name of University/Institution_Team Name
- Example : [TVC]_USM_Team01
- **The submission MUST include:**

  (1) Video (MP4/WMV file)

  (2) Video summary (PDF file)

  (3) A cover page (PDF file)
- **File name format:**

  (1) [TVC]_Name of University/Institution_Name of Team_Video

  (2) [TVC]_Name of University/Institution_Name of Team_Summary

  (3) [TVC]_Name of University/Institution_Name of Team_Cover Page
- Please ensure that the summary and cover page have been converted to **PDF files** and video are in **MP4/WMV file.**
- All successful receipt of submissions will be notified via the provided email within 3 working days. If the participants do not receive any reply from us, please do not hesitate to contact the organizer.

JUDGEMENT CRITERIA

- CONTENT [40%]
  - Clarity
  - Organization
  - Relevance to Theme
  - Information's Accuracy
  - Creativity and Innovation
  - Example and Application
  - Engagement and Interest

    - Ethical Consideration and Responsibility
- VISUAL APPEAL [40%]
    - Impact
    - Visual Appeal
    - Audio Quality
    - Use of Visual Aids
    - Editing and Pacing
    - Graphic and Visual Effects
    - Consistency and Cohesiveness
    - Use of Subtitles and Accessibility Features
- MESSAGE DELIVERY [20%]
    - Clarity
    - Impact
    - Engagement
    - Tone and Appropriateness

RESULTS

The winners of the competition will be announced during the NACES 2025 Closing Ceremony on 14 December 2025.

PRIZES

1st Prize - RM 350

2nd Prize - RM 300

3rd Prize - RM 210

All prizes were subjected to increment based on decisions from the organizer.

IMPORTANT NOTES

- Each participant must agree to be bound by the official contest rules. The organizer has all the rights to eliminate or disqualify any participants that violate the guidelines as stated above. Such actions may be taken by the host without any prior notice.
- The judges' decisions are final and any appeals to the decisions will not be entertained.
- Participants must complete the registration form by **10 October 2025** to be eligible for participation.

- Organisers will hold the right to publish submitted presentations for future publications without prior notice to the participants. Kindly notify the organiser if you have a patent or copyright reserved.
- Registration fees are non-refundable.
- The contents of this booklet are subjected to amendment and improvisation. Participants will be notified when the amendments are made.

CONTACT INFORMATION

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