UTM UNIVERSITI TEKNOLOGI MALAYSIA

IVAT Newsletter

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IVAT

is the abbreviated name for the Institute of High Voltage and High Current, or in Malay, **I**nstitut **V**oltan dan **A**rus **T**inggi – a Centre of Excellence of Universiti Teknologi Malaysia (UTM).

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IVAT Organises Short Course

Group photo

JOHOR BAHRU, 24 May 2023 – IVAT successfully organised a short course on "Dielectric Breakdown Measurement and Data Analysis" on 24 May 2023 at Universiti Teknologi Malaysia. The course, which is HRD Corp claimable, was facilitated by Assoc. Prof. Eur. Ing. Ir. Ts. Dr. Lau Kwan Yiew and attended by 25 participants including researchers and engineers from Tenaga Cable Industries and TNB Research.

(continued on page 3…)

IVAT Contributes to Local Community

MERSING, 17 December 2022 – The installation of a solar electricity system in every house in Kampung Tewowoh, Mersing, was successfully implemented in March 2022 and since then, there was no more sound of diesel generators in the village. A total of 145 residents consisting of 19 houses were able to enjoy the use of electricity supply for free, which previously costed them around RM 300 per month. However, at the end of November 2022, the research team of Universiti Teknologi Malaysia (UTM) was informed by the head of the village that two houses were needed to be demolished because they were

Group photo

worn out and the relocation of the supplied solar electricity system needed to be done.

(continued on page 5…)

IVAT Director's Remarks

Ts. Dr. Zulkarnain Ahmad Noorden, Director, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

It is with profound pleasure and a deep sense of responsibility to deliver this remark as the new Director of IVAT at the Faculty of Electrical Engineering, Universiti Teknologi Malaysia. As I step into this esteemed position, I am humbled by IVAT's great legacy and remarkable achievements over the past years.

IVAT's journey began in 1991 when it was established as an educational laboratory. It provided essential facilities for experiments, research, and consultancy services in high voltage engineering. In 1992, IVAT became the first institution in the country to receive accreditation for high voltage test and calibration works according to ISO/IEC Guide 25. Over the years, we have continued to elevate our standards, achieving accreditation with the MS ISO/IEC 17025 standard in high voltage electrical calibration and testing works in 2004 and 2013, respectively.

Throughout our journey, IVAT has been at the forefront of high voltage research, undertaking ground-breaking works in lightning, dielectrics, electrical discharges and energy storage. These endeavours have not only yielded significant advancements but also attracted international collaborations, research grants, high -impact publications, and awards. Our contributions to scholarly excellence, leadership of renowned conferences and professional societies, and the nurturing of global talents through postgraduate programmes have strengthened IVAT's prominence on the global stage.

As the newly appointed Director, I am committed to guiding IVAT to even more remarkable heights upon the strong foundation laid by my predecessors. The excellence demonstrated by our academic and support staff, postdoctoral fellows, and research students fills me with immense pride as they have been instrumental drivers of IVAT's successes thus far. With collective effort, we will continue revolutionising high voltage technology while actively seeking partnerships that result in meaningful contributions for our industry.

To our valued customers, collaborators, and stakeholders, I extend my gratitude for your unwavering support. Your trust and partnership are integral to our collective achievements. Together, let us embark on this new chapter, fuelled by innovation, collaboration, and a shared vision. We will make IVAT a beacon of excellence in high voltage research and development.

IVAT's Hari Raya Celebration

JOHOR BAHRU, 1 June 2023 – The Hari Raya celebration for IVAT's staff members and students was successfully held on 8 May 2023. The celebration started around 12 pm with the arrival of very important guests from various departments and faculties at Universiti Teknologi Malaysia.

Photo taken during Hari Raya celebration

Not to forget, students of IVAT were also invited to this event. After the recitation of doa from Assistant Engineer Mr. Mohamad Syahrin, the Director of IVAT, Ts. Dr. Zulkarnain Ahmad Noorden, was invited to deliver his speech. Among all, Ts. Dr. Zulkarnain thanked the committee members of IVAT's Welfare Club (KKSI) for arranging the ceremony and hoped that the event would be annually celebrated as part of IVAT KKSI's activities. He also stressed on the importance in achieving IVAT's key performance indicators in bringing IVAT to a greater height. After the speech, all guests enjoyed the meals. A variety of delicious dishes were available, including lemang, satay, cakes, desserts, fruits, ketupat, and many more.

Mr. Mohamad Syahrin Mohamad, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

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Knowledge Sharing Through Short Course

(… continued from page 1)

During the course, the participants were introduced to the topic of breakdown phenomena in solid dielectrics. The participants were also exposed to the requirements for conducting a laboratory-scale breakdown measurement of solid dielectric samples. An appropriate data analysis technique for interpreting breakdown results was also discussed with the participants, where the participants had the opportunity to perform hands-on calculations to better understand the statistical analysis. Towards the end of the course, each of the participants was assessed through a quiz to gauge their level of understanding from attending the course.

Dr. Lau delivering the short course entitled "Dielectric Breakdown Measurement and Data Analysis"

Meanwhile, another short course entitled "Calibration and Measurement", facilitated by Assoc. Prof. Eur. Ing. Ir. Ts. Dr. Lau Kwan Yiew and Ts. Dr. Noor Azlinda Ahmad, was held on 21 August 2022 at Universiti Teknologi Malaysia. The

Group photo during the short course entitled "Calibration and Measurement"

short course provided the participants an overview of the topic of calibration and measurement, including an introduction to the basics of measurement, general terms in metrology, calibration requirements, uncertainty of calibration and MS ISO/IEC 17025: 2017.

IVAT wishes to thank the participants for attending the short courses and looks forward to conducting more courses that benefit the participants in the future. Further information about the institute's courses can be found from the institute's website ivat.utm.my or by emailing an enquiry to ivat@utm.my..

Assoc. Prof. Eur. Ing. Ir. Ts. Dr. Lau Kwan Yiew, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

IVAT's Appreciation Ceremony

JOHOR BAHRU, 8 February 2023 – IVAT held an appreciation ceremony for its staff members at Sunway Big Box Hotel, Johor Bahru on 7 February 2023 with Arabic Night theme.

The appreciation ceremony was a platform where IVAT appreciates its staff members for all the effort and work during the past year to ensure IVAT was always on the right track and always moved forward together with the current development in the industry.

There are a few awards presented during the ceremony, including the Publication Award, Sustainability Award and Community Service Award.

Mr. Mohamad Syahrin Mohamad, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

Group photo

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IVAT Successfully Held Short Course on "Electrical Safety : What You Need to Know?"

Dr. Zuraimy with the participants

Dr. Zuraimy delivering his lecture during the short course

JOHOR BAHRU, 31 October 2022 – IVAT conducted a short course on "Electrical Safety: What You Need to Know?" on 31 October 2022, facilitated by Dr. Zuraimy Adzis. The participants were mainly from Metcal Technologies who were interested to know more about electrical safety related to their job environment.

During the one-day short course, many details about electrical safety were discussed. After the lecture, all the participants visited IVAT's laboratory, where Dr. Zuraimy showed and explained the operation at IVAT's laboratory and the safety aspect that IVAT followed to make sure the laboratory and the people within the laboratory were safe.

Dr. Zuraimy Adzis, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

IVAT Takes Part in Laboratory Open Day

IVAT staff at morning session

IVAT staff at evening session

JOHOR BAHRU, 12 January 2023 – IVAT's staff members took part on the laboratory open day that held by University Industry Research Laboratory of Universiti Teknologi Malaysia on 11 January 2023. During the event, IVAT took the opportunity to disseminate information on what IVAT actually did and what serviced that IVAT could provide to the industry, community and also students. IVAT's staff members also shared information related to their job to visitors who came to their booth and provided them with some merchandises after following and shared IVAT's Facebook page.

Prof. Dr. Zulkurnain Abdul Malek, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

IVAT Staff Contributes to Community Service at Kampung Tewowoh, Mersing

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On the initiative to relocating the system to their new houses, UTM researchers (7 staff members from the Faculty of Electrical Engineering of UTM and IVAT) have collaborated with 3 students from the IEEE Student Branch of UTM and 9 participants from Institut Latihan Perindustrian Mersing, Pahang. The relocation of the solar electricity system was carried out on 17 December 2022, which involved 3 main activities, namely: i) the dismantling of the existing wiring and the solar electricity system in the old houses, ii) the installation of the system and the new wiring in their new houses, and iii) performance monitoring for other 117 solar electricity systems in the village.

IVAT staff members, FKE Lecturer and students during their CSR at Kampung Tewowoh, Mersing

Dismantling of the solar system and solar panel

Relocation the solar system and solar panel

Group photo

After the successful relocation of the system, testing was done by the UTM research group and partners to ensure the system was properly working. The monitoring process in the next 3 months after the relocation process will also be carried out by the same research group.

Ts. Dr. Zulkarnain Ahmad Noorden, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

High Voltage Calibration, Testing, Consultancy, Training, Research and Development at Institute of High Voltage and High Current, Universiti Teknologi Malaysia

Introduction

- The Institute of High Voltage and High Current, or in Malay, Institut Voltan dan Arus Tinggi (IVAT), was established in Universiti Teknologi Malaysia in 1991
- IVAT's establishment stems from the need of the country for a centre which carries out research and development, testing and calibration work, and training in the field of high voltage engineering
- IVAT is a laboratory accredited under the Laboratory Accreditation Scheme of Malaysia and meets the requirements of MS ISO/IEC 17025:2017 (general requirements for the competence of testing and calibration laboratories)

Accredited Calibration and Testing Services

Ensure the reliability of your high voltage equipment through

Accredited Calibration & Testing Services

Accredited scope of calibration:

- AC – up to 180 kV rms
- DC – up to 180 kV
- Impulse – 50 kV to 140 kV
- High current – up to 1000 A

SAMM 285

Accredited scope of testing:

- Power cable AC voltage withstand test from 2 kV to 180 kV at 50 Hz

SAMM 709

Research and Development

IVAT has 2 main research themes covering comprehensive research on high voltage engineering:

Lightning Research and Safety:

- Lightning monitoring, detection, and protection system
- Lightning characterization, electromagnetic field, and radio frequency emission
- Overvoltage protection system and insulation co-ordination, measurement techniques, surge arresters, and magnetic engineering
- Grounding system improvement and measurement method
- Super capacitor application in high voltage systems
- Electromagnetic compatibility and interference in high voltage systems

PARTIAL DISCHARGE TEST EQUIPMENT

LIGHTNING DETECTION PARALLEL ANTENNA

OUTDOOR INSULATOR FLASHOVER

ELECTRICAL TREE GROWTH

Dielectrics, Discharges and Diagnostics:

- Electrical discharge, detection, and monitoring
- Partial discharge analysis on polymeric insulating materials
- Condition monitoring of high voltage equipment
- Diagnosis and fault analysis
- Forensic investigation
- Material assessment
- Plasma and ozone generation applications
- Low voltage and telecommunication surge protective devices

Consultancy and Training Services

IVAT offers consultancy services for the following areas:

- Laboratory accreditation based on MS ISO/IEC 17025: 2017
- Lightning protection systems for buildings
- Protection systems for electrical power networks
- Grounding systems installations
- High voltage product development
- Low voltage and telecommunication surge protective devices

IVAT also organises training, visits, workshops, seminars and short courses. Some popular modules include:

- Electrical Safety Seminar
- Fundamentals of High Voltage Technology
- Three-day Short Course on High Voltage Testing Techniques and Safety
- Two-day Short Course on Grounding Systems
- Short Course on Lightning Protection for High and Low Voltage Systems
- Short Course on Partial Discharge Phenomena

Contact details :

Ts. Dr. Zulkarnain Ahmad Noorden
Director / Senior Lecturer
E-mail: zulkarnain-an@utm.my

Ts. Dr. Noor Azlinda Ahmad
Deputy Director (Service, Consultancy and Training) / Senior Lecturer
E-mail: noorazlinda@utm.my

Ts. Dr. Mona Riza Mohd Esa
Deputy Director (Research, Networking and Commercialisation) / Senior Lecturer
E-mail: monariza@utm.my

Dr. Zuraimy Adzis
Laboratory Head / Senior Lecturer
E-mail: zuraimy@utm.my

Dr. Zulkurnain Abdul Malek
Signatory / Professor
E-mail: zulkurnain@utm.my

Dr. Mohamed Afendi Mohamed Piah
Signatory / Associate Professor
E-mail: fendi@utm.my

Eur. Ing. Ir. Ts. Dr. Lau Kwan Yiew
Quality Manager (Calibration) / Competent Electrical Engineer / Associate Professor
E-mail: kwanyiew@utm.my

Ts. Dr. Mohd Hafizi Ahmad
Quality Manager (Testing) / Senior Lecturer
E-mail: mohdhafizi@utm.my

Office Phone:
+607 553 5615

Official Website:
ivat.utm.my

Address:
Institute of High Voltage and High Current, Block P06, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, 81310 Johor Bahru, Malaysia.

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Congratulations to IVAT's Postgraduate Students

(Photo on the right)

IVAT's staff members extend their heartiest congratulations to one of their PhD students, Siti Noorhazirah Kamarudin (standing on the right), for being conferred the Best Paper Award for her paper entitled "Structure and DC Breakdown Properties of Polypropylene/ Elastomer Blend" at the 2023 IEEE International Conference in Power Engineering Applications (ICPEA 2023) held on 6-7 March 2023 in Putrajaya, Malaysia. Siti is under the main supervision of Assoc. Prof. Eur. Ing. Ir. Ts. Dr. Lau Kwan Yiew and co-supervision of Ts. Dr. Noor Azlinda Ahmad.

(Photo on the left)

IVAT's staff members also extend their heartiest congratulations to one of their PhD students, Nur Azalia Azrin (standing on the right), for being conferred the Best Paper Award for her paper entitled "Thermal and AC Breakdown Properties of Polypropylene/Ethylene-Butene Elastomer Blends" at the 2022 IEEE International Conference in on Power and Energy (PECON 2022) held on 5-6 December 2022 in Langkawi, Malaysia. Azalia is under the main supervision of Ts. Dr. Noor Azlinda Ahmad and co-supervision of Assoc. Prof. Eur. Ing. Ir. Ts. Dr. Lau Kwan Yiew.

IVAT's Family Day

On 1 September 2022, IVAT successfully held its Family Day at Bidaisari Resort, Janda Baik, Pahang. Various activities were organised for IVAT's staff members and their family members. The main purpose of the event was to strengthen the relationship between the staff members and also their family members in achieving work-life balance.

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IVAT's Management Review Cum Strategic Planning Workshop Successfully Held

Group photo

JOHOR BAHRU, 9 February 2023 – IVAT held its management review cum strategic planning workshop at the Sunway Hotel Big Box, Johor Bahru, on 7-8 February 2023.

On the first day, a management review meeting was carried out for IVAT's calibration laboratory accredited under the MS ISO/IEC 17025 standard. Various matters concerning the calibration activities of the laboratory were discussed, including the review of the objectives and policies relevant to the laboratory, the analysis of risks and improvements related to the calibration jobs, and the implementation of corrective and preventive actions for the laboratory. Similar management review discussion was also carried out for IVAT's testing laboratory accredited under the MS ISO/IEC 17025 standard.

On the second day, a strategic planning workshop was conducted to outline IVAT's strategies aligned to UTM envision 2025. Detailed discussion among IVAT's staff members on the latest achievements of IVAT's Key Amal Indicators was carried out, followed by a brainstorming session on the potential improvements of IVAT's achievements in positioning IVAT as a centre of excellence in high voltage.

All IVAT's staff members are thankful for participating in the fruitful event and look forward to a successful year ahead.

Assoc. Prof. Ir. Ts. Dr. Lau Kwan Yiew, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

IVAT's Academics Deepen Their Knowledge

JOHOR BAHRU, 13 June 2023 – IVAT's staff members engaged themselves in a series of exclusive, intensive training sessions with an esteemed lightning protection and earthing expert, Ir. Dr. Aziz Ahmad Marican, from DCS Engineering Sdn. Bhd. The highly anticipated training took place on 11-12 June 2023 at IVAT Seminar Room, pulsating with anticipation. The two-day immersive training session was participated by eight academic staff members of IVAT with an engaging ideas and insights exchanging session with Ir. Dr. Aziz. A fruitful discussion ensued, fueling IVAT's staff members with a collective passion for knowledge. The session not only enriched the knowledge of IVAT's staff members, but also kindled a burning desire to explore more about electrical safety.

Group photo

Ts. Dr. Mona Riza Mohd Esa, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

Workshop on Extension of IVAT's Testing Scope and Book Chapters

PUTERI HARBOUR, 20 March 2023 – To be an excellent and well-known high voltage testing institute in Malaysia, IVAT planned to have more testing services for it's industrial customers in the future. Therefore, IVAT held a workshop to discuss extension of its testing scope needed by the high voltage industry and for research purposes.

Group photo

During the two-day workshop held on 15 and 16 March 2023 at Jen Hotel Puteri Harbour, IVAT's staff members discussed and brainstormed about the required improvements at IVAT to make sure all details and requirements to extend the testing scope such could be met. All IVAT's staff members, including academic and non-academic personnels, have discussed together and helped each other in providing some ideas during the workshop. This smoothened the discussion in extending the testing scope.

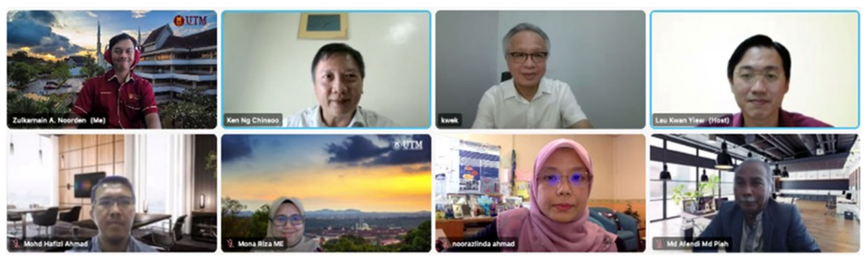
Beside that, discussion on IVAT's book chapter publications was also held during the workshop in order to fulfill one of the requirements of Malaysia Research Assessment (MyRA) and Higher Education Centre of Excellence (HiCoE). All academic staff members were divided into two groups and each group had their theme of book chapters to discuss. At the end of the workshop, each group presented their findings and looked forward to the book chapters to be published.

Mr. Mohamad Syahrin Mohamad, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

IVAT's Surveillance Audit Successfully Concluded

JOHOR BAHRU, 17 November 2023 – The MS ISO/IEC 17025 Surveillance Audit of IVAT's Calibration Laboratory (SAMM 285) was conducted by the Department of Standards Malaysia on 16 November 2022.

IVAT wishes to thank Lead Assessor Mr. Ng Chin Soo and Technical Assessor Dr. Kwek Kuan Hiang for their advice and guidance given throughout the audit in improving the management and technical aspects of its calibration laboratory. IVAT also extends its special thanks to Quality Manager of Calibration Assoc. Prof. Eur. Ing. Ir. Ts. Dr. Lau Kwan Yiew and his team members for their full cooperation and commitment given in ensuring the success of the audit session.



Ts. Dr. Zulkarnain Ahmad Noorden, Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

Group photo taken during the virtual audit session

More News on IVAT and MyHVnet

In case you missed the previous news on IVAT, Issue 9 of IVAT Newsletter, published in June 2022, can be downloaded from the following link: http://ivat.utm.my/newsletter/

Meanwhile MyHVnet Newsletter (an initiative for the dissemination of high voltage related news, with particular emphasis on MyHVnet's activities), can be downloaded from the following link: http://ivat.utm.my/myhvnet/news/

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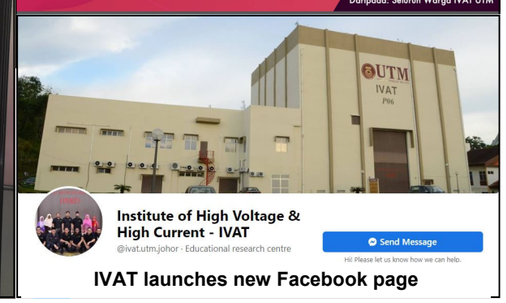
Other Happenings



Welcome to IVAT

IVAT, Universiti Teknologi Malaysia (UTM), is committed to entertain visits by delegates from not only its own university, but also as far as overseas. The main aim for IVAT organising visits is to share their research, services and consultancy experience to as many people as they could, especially in areas relevant to high voltage engineering.

For interested students from schools or higher learning institutions, the focus of visit would be on IVAT's role in building the nation through their technical support to electrical energy industries to achieve reliable and efficient operations. This is inculcated through their fascinating demonstration on high voltage air discharges (either impulsive or sustainable low current arcs).

For representatives from private companies, IVAT showcases their services and consultancy capabilities, as well as their research achievements, in attempts to increase the return of investments to the university. As for executives of ministerial bodies and government parastatals, IVAT extends their knowledge and experience to open possible collaborations on research works.

A routine visit to IVAT would include a 5-minute video presentation on IVAT, followed by a 10-minute briefing by an IVAT's academician, then a question-and-answer session on any topic relevant to the visit. Interested parties are most welcome to visit IVAT.

Photos taken during visits to IVAT




Published by:

Institute of High Voltage and High Current (IVAT)
Block P06
Universiti Teknologi Malaysia
81310 Johor Bahru, Johor
Malaysia
Phone: +60 7 553 5615
Fax: +60 7 557 8150
E-mail: ivat@utm.my
Website: ivat.utm.my

The Institute of High Voltage and High Current, or in Malay, Institut Voltan dan Arus Tinggi (IVAT), was established in Universiti Teknologi Malaysia in 1991. It was initially an educational laboratory which provides facilities for carrying out experiments, research and consultancy services in high voltage engineering, as early as the 1970s.

The establishment of IVAT stems out from the needs of the country for a centre which carries out research and development, test and calibration works in high voltage areas, so that efficient technologies and power system apparatus can be effectively employed for the transmission and distribution to the consumer of electrical energy.

In 1992, the institute became the first institution in the country to be accredited to handle high voltage test and calibration works according to ISO/IEC Guide 25. In 2004, IVAT was accredited with the ISO/IEC 17025 in the field of high voltage electrical calibration. In certification, IVAT has also successfully migrated to MS ISO/IEC 17025 since July 2007 till date. Since 2013, IVAT has been accredited with the on-site calibration and the scope of calibration has been extended up to 180 kV AC (alternating current), 180 kV DC (direct current) and 140 kV impulse. Beginning 2015, IVAT has been accredited with power cable AC voltage withstand test. Recently in 2020, IVAT has successfully migrated to the latest MS ISO/IEC 17025:2017 standard.