

ENGINEERUS

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– What it means to YOU

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SKILLS FOR THE FUTURE

So much has been said about SkillsFuture, introduced by the government in early 2015. What, in a nutshell, is it all about? In this issue, **ENGINEERRUS** gives you a bite-sized breakdown of what SkillsFuture means to you.



What is SkillsFuture?

SkillsFuture is a national initiative that aims to raise the relevance of the skill-sets of our workforce so as to benefit the individual, companies, and the economy. Basically, this is done in two ways:

- 1) Strengthening the link between what is learnt in school and what is used or applied in the industry, so as to support the transition of graduating students from studies to the world of work, while ensuring that employers get the skill-sets that they need.
- 2) Encouraging life-long learning to ensure that the skill-sets of our workforce do not remain stagnant, by providing working adults with opportunities to upgrade themselves through courses. This will benefit employers as it ensures that their staff are well equipped to meet the dynamic needs of the industry. The individual also benefits as it opens the door to skills-based wage increments and meaningful career advancement upon programme completion and satisfactory job performance.

Singaporeans aged 25 and above have also been given \$500 in credit which they can use to pay for upgrading courses.

Key Facets of SkillsFuture

Place & Train

Polytechnic and ITE students can get industry exposure and learn through meaningful work assignments or projects under an enhanced internship scheme worked out between the school and the industry partner. A mentor from the industry is assigned to guide and train the student intern in tackling problems in real life contexts.

Earn & Learn

This is a work-cum-study programme in which fresh graduates from polytechnics and ITEs are matched to suitable employers related to their fields of study. They will undergo structured on-the-job training and mentorship, leading to an industry-recognised certification. Participants may also be placed on enhanced career development pathways in their companies.

A typical Earn & Learn programme could see an employee working in the company for 3 days a week, and then attending classes in a polytechnic for 2 days, thereby giving them a practical focus to what they learn. Those who successfully complete the programme may also receive a sign-on cash bonus from their employer.

Young Talent Programme

Under this programme, suitable polytechnic and ITE students can sign up for overseas job placements so as to gain valuable international working experience that will better prepare them for future global careers.

SkillsFuture @ TP

The School of Engineering at TP has implemented SkillsFuture initiatives to ensure that our graduates will have an edge in the job market upon graduation.

In addition, we are also offering Certificate and Specialist Diploma courses for working adults under the SkillsFuture framework, for the Aerospace, Air Transport and Electronics sectors, covering the fields of Aircraft Maintenance, Aviation Management and Semiconductor Manufacturing. More programmes covering other disciplines will continue to be added.



Sources:

www.moe.edu.sg, www.asiaone.com

WERE YOU HERE?

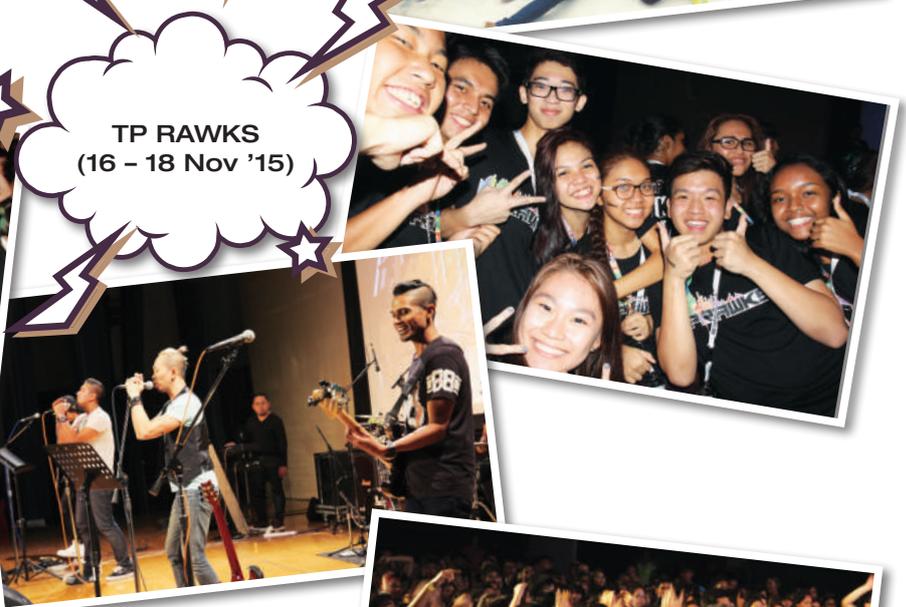
Hundreds of secondary school students visited TP's School of Engineering, checking out the facilities, attending workshops to pick up Engineering-related skill-sets, and having fun learning too.

Were you one of them?

TP Sneak Preview
(15 - 16 Oct '15)



TP RAWKS
(16 - 18 Nov '15)



THE REAL TASTE

During their school holidays, 30 secondary school students lived a week in the life of an Engineering student at TP to get a taste of Poly life. Our reporter speaks to two of them.

By Natalyn Guam



Have you been receiving dozens of brochures from polytechnics telling you about their diploma courses? And did you end up even more confused after reading them?

Well, fret not, because you can chuck all those unnecessary brochures aside and get a first-hand experience as a polytechnic student for one week — by joining the “TP Buddy Programme”!

Muhd Zamir bin Abdul Rahim and Chan Min Yi, from Loyang Sec School and CHIJ (Toa Payoh) respectively, did just that. For a week (2 — 6 Nov '15), they followed the time-tables of their assigned buddies, Timothy James and Xu Miao — both first year students in the Electrical & Electronics Engineering (EEE) programme at TP — attending lectures, tutorials, lab sessions, project discussions and even CCA activities together.

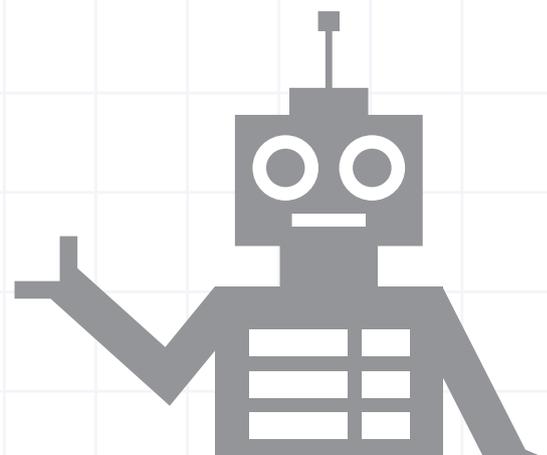
So how was the experience? “Well, I found the lessons slightly beyond me, but it doesn’t matter, because I came here to get a taste of poly life, not to prepare for my ‘O’ levels!” exclaimed Zamir, laughing. “It’s so warm and friendly here and everyone smiles at you!” he continued. Being a meat lover, Zamir also checked out the Indonesian stall at the School’s food court to grab some wings. His verdict? “Awesome!”

Min Yi, on her part, felt that not wearing a uniform in Poly would take some getting used to. “I prefer wearing a uniform because then, no one will judge your appearance or your dressing,” she assessed.

Asked if they would join TP after their ‘O’ levels, Min Yi said: “I will have to look at my ‘O’ level results first”. As for Zamir, he excitedly declared: “Since I live in the East, Temasek Polytechnic will probably be my choice!”.



Newfound friends Zamir, Timothy, Min Yi and Xu Miao, with this reporter (wearing lanyard)



MAKING BUILDINGS MORE EFFICIENT

Energy-saving proposals for buildings in our Central Business District won our students a Platinum and a Gold award in the Building Energy Efficiency Solutions Competition organised by the Building & Construction Authority on 2 Sep '15.

The team from the Diploma in Green Building & Sustainability clinched the top Platinum award with their solutions for improving the energy efficiency of the Marina Bay Financial Centre Tower 1.

They proposed a heat recovery system which extracts heat from the car park to produce hot water for the building's restaurant, a ventilation and lighting system that makes use of transparent solar glass on the plaza to allow daylight into the car park, and the use of a smart Building Management System (BMS) to identify sensors in the building which need to be recalibrated, thereby saving on manpower and time.



A second team from the Diploma in Clean Energy took home the GoldPlus award with their proposal to set up an energy portal called "Eco Common Space Co-op" for Keppel Bay Towers. The portal will, among other things, facilitate the sharing of common resources such as pantry appliances and office equipment among the building's occupants, and allow tenants to report on energy wastage practices within the building.



SHOW ME WHAT YOU MEAN!

Design and build an exhibit that best demonstrates a physical science phenomenon — that was the challenge to participants in the Amazing Science-X Challenge.

The TP team, represented by students from the Diploma in Aerospace Electronics and Diploma in Electronics, successfully demonstrated the concept of transforming heat energy into electrical energy.

They first built a Stirling engine to convert heat into kinetic energy (movement), and then used a dynamo to convert this kinetic energy into electrical energy which can be used — a complex 2-step process which earned them praises from the judges and the Gold award.

The competition was jointly organised by DSO National Laboratories, Science Centre Singapore and NUS on 18 Sep '15.



EVERY BREATH YOU TAKE



With every breath you take, we can hear you — using the “Adventitious Breath Monitor”.

Developed by four Biomedical Engineering students, this application (in mobile app or desktop versions) can detect, read and interpret the sound of your breathing via an audio detector — either the microphone of a mobile device or a stethoscope paired to it by Bluetooth — placed on your chest or trachea.

The app will alert you if any signs or symptoms of respiratory disorders are detected based on your breathing patterns, with the results available instantly. The respiratory sound can also be played back and viewed in graphical form.

The project won a Bronze award in the IES Innovation Challenge (formerly known as IES Design Award), organised by the Institution of Engineers Singapore on 18 Jul '15.



Three GBS students did a study of Pasir Ris Park to determine the best positions for locating park tables and benches, as well as exercise facilities, that would provide the best thermal comfort and healthiest air quality.

Using a self-assembled air quality sensor, a cloud software called Arc-GIS and a mobile app called “ArcCollector”, they collected data on the temperature and carbon monoxide levels at various points in the park between 11am and 4pm over 3 days as part of a crowd-sourced database. The data was then analysed on the Arc-GIS map to pin point the most ideal locations.

So the next time you are planning an exercise routine or a picnic in the park, check the air quality on their web map first!

THE AIR THAT I BREATHE

A study of the air quality in Pasir Ris Park won three students from the Diploma in Green Building & Sustainability (GBS) a Distinction award in the Singapore Geospatial Challenge organised by the Singapore Land Authority on 29 Jul '15.



IT WAS AMAZING!

Four students from the Diploma in Aerospace Engineering took part in the “Amazing Aviators Race” organised by the Association of Aerospace Industries Singapore on 5 Sep '15. Modelled after the popular TV series, “Amazing Race”, teams race to specific check points where they must perform assigned tasks. Team leader, Matthew Lim, shares his experience.

By Matthew Lim (AEG)



Matthew (third) and his amazing team

The sun had just risen, and we were gathered at the Singapore University of Technology & Design (SUTD), fresh and ready for an amazing journey.

The race consisted of five stations and we were only allowed to travel by bus or MRT. At each station, we had 20 minutes to complete a task; the sooner we completed it, the more points we scored.

After unlocking a code, we were off to our first station, Changi Airport Terminal 2. There, we had to solve a riddle, do a crossword puzzle, and search for a mystery person. We took a good 13 minutes just to crack the riddle. Amazingly, we completed this station — with 2 minutes to spare!

Our next station was Gardens by the Bay. I was assigned to colour a particular template. While waiting, I decided to help another participant in colouring his template and to my surprise, he returned that favour when it was my turn.

We then proceeded to our third station, the new National Stadium, where we had to complete 4 mini traditional games. Whether it was by luck or through sheer skill, we were out of there in just 2 minutes!

It was a long train ride to our fourth station, Seletar Airport. It was 1pm, our stomachs were complaining and everyone was shagged. We were beginning to wonder whether it was all worth it. As pessimism crept in, I told the guys to keep up the spirit and to press on!

At Seletar Airport, we watched a video and were given a tour of the facilities, after which we were tested on the facts. We then returned to SUTD, the final station, where we had to pilot a drone through some obstacles and land it in the designated area. Some of us had done it before in school, so it was a piece of cake!

We then sat down to nurse our aching bodies and await the results. Remarkably, our team won first place! No wonder they call this the “amazing” race.



Matthew's team with other participants

OUR ENERGY SAVERS



Energy Super Saver Card Reader

With this new electrical activation system for rooms, hotels can now trim their utilities bill.

Invented by two students from the Diploma in Clean Energy, the system will recognise the presence of a guest in the room via a Two-Factor-Authentication (2FA) process: First, when a guest slots his card into the card-receptacle upon entering the room, the infrared transmitter in the receptacle detects whether it is the correct card for that room. Second, the guest must turn on the Bluetooth function on his mobile device and key in his room number. Only then is electricity supply to the room "unlocked". Once the Bluetooth connection is broken when the guest leaves the room, electricity supply to the room is automatically cut off.



Our Engineering students invented 2 devices to help save energy, each winning a Merit award at the Energy Innovation Challenge held on 24 Jul '15.



Sound Power

Three students from the Diploma in Green Building & Sustainability invented a device, called "Sound Power", which can harvest electricity from sound — which is free of charge! The device can ideally be placed at noisy locations to provide electrical power to run simple appliances. As sound waves are in essence the vibration of air, piezo-electric buzzers are used as transducers to convert this movement into electricity.

3D LIVE!

Students from our Diploma in 3D Interactive Media Technology (IMT) showcased their 3D design skills, capturing a Gold and a Bronze award in the "3D Print & Blocks Design" category of the iDigix 3D-Tronics Challenge, themed "SG 50: Defence of Singapore", held on 28 Jun '15.

Contestants were required to design and produce a 3D printed model of an object or vehicle that could help to keep Singapore safe.

IMT students designed and fabricated a unique tank with circular tracks for added stability, winning the Gold, while their limited edition "SG50" armoured vehicle earned the Bronze.



BE SAFE, USE OUR INVENTIONS!

Innovative inventions by our Engineering students that help to enhance our homeland security won 1 Gold, 2 Silver and 5 Merit awards at the Security Awareness for Everyone (SAFE) competition organised by the Ministry of Home Affairs on 13 Nov '15. Here are some of the inventions:



PASS (Silver award)

This "Portable Automobile Security Screener" (PASS) is a remote-controlled car model equipped with a high-resolution video camera and strobe lights to capture images of a vehicle's undercarriage, so as to detect drugs, contraband or explosives. The images are beamed via radio frequency to a receiver up to 300m away, and displayed on a monitor in real-time.



HERO (Silver award)

This "Heat Exterminating Robotic Orbiter" (HERO) is a robotic fireman that can launch a spherical capsule containing a fire-retardant (Monoammonium Phosphate, also known as ABC powder) up to a distance of 13 metres to extinguish fires safely.



Pocket Breathalyser (Merit award)

This pocket breathalyser will be able to tell you in 5 seconds if you have exceeded the legal limit for the amount of alcohol in your blood. Unlike conventional breathalysers, this handy and portable device fits neatly into your pocket, and comes with an Android app that displays the concentration of alcohol when you puff into its sensor. The Android app also includes a game which tests your sense of balance, and thereby determine if you are fit to drive.



Mini Bazooka (Merit award)

This "Mini Bazooka" uses compressed carbon dioxide from a canister to project a "bomb" into the car of a getaway criminal, smashing its windscreen in the process. However, the "bomb" doesn't explode; instead it emits a very high pitched sound that will force the criminal to stop and abandon the car.



LEARNING ENGINEERING @ POLYTECHNIC

More than 900 secondary school students congregated at Temasek Polytechnic for the annual Engineering Science & Discovery event, featuring an exhibition of engineering projects by the 5 local polytechnics, as well as 3 talks by industry experts entitled "Innovation is a journey, not an idea", "Fascinating Physics in Engineering", and "Discovering Engineering with magic".

Organised by the national Learning Engineering at Polytechnics (LEAP) committee, the event was this year hosted by Temasek Polytechnic and held at TP's Temasek Convention Centre on 14 Oct '15.



"Sensory Wonders" @ TP



"Interactive Mirror" @ TP

FIGURE IT OUT... AND WIN A 16GB LIMITED EDITION WOODEN THUMB-DRIVE!



You are a noble knight trying to kill a dragon with 3 heads and 3 tails. With one swipe of your magic sword, you can either cut off one head, two heads, one tail or two tails. But...

- When you cut off one head, another one grows
- When you cut off one tail, two new tails grow
- When you cut off two tails, one head grows instead
- When you cut off two heads, nothing grows.

To kill the dragon, you must cut off all heads and tails so that what remains is only the lower body with its two useless wings.

How many swipes of your magic sword are needed to kill the dragon?

ANSWER TO PUZZLE #10

Answer $f\left(\frac{1}{b}\right) = 1$ with $c = b^2$

Winners:

(16GB limited edition wooden thumb-drive)

Muhammad Danish b Yusri (Bt Panjang), Kimberly Grace Agdeppa Rosal (Riverside), Christian James Welly (Beatty), Sherrill Ashley Ho (Yuying), Ima Ooi (Ngee Ann), Zhang Yue Ying (Fuchun), Chan Yi Ru (Hai Sing Catholic), Chong Wei Neng (Seng Kang), Lee Yan Yee (Serangoon), Lai Yi Jing (Ahmad Ibrahim).

This contest is open to secondary school and ITE students only.

Email your answers, with full name, school, and HP number, to: cheeseng@tp.edu.sg with the subject title, "Engineerrus Maths Puzzle 11".

The first 10 correct entries drawn after the closing date (1 June 2016) will each win a limited edition 16GB wooden thumb-drive.

THEY JUST WANNA HAVE FUN



Have you wondered what it would be like to turn a school into a street market?

That was what happened on 13 Nov '15 when Engineering students played entrepreneurs for a day to raise funds for the Campus Care Network (CCN) to help needy TP students, setting up stalls along the concourse to sell their wares — from hot cakes, bubble tea, ice cream, flowers, handphone covers, and clothing items, to services such as henna-painting, hair-grooming, palm-reading, photo-taking and car-washing.

Check out
our story
in photos!



WHAT A COOL EXPERIENCE!



By Kenneth Pua (GBS)

About 30 students from the Diploma in Green Building & Sustainability visited the District Cooling System facility at Marina Bay Sands which helps companies to save money. One of them, Kenneth Pua, writes about it.

I bet you never knew that under the tonnes of concrete at Marina Bay Sands lie numerous air-con cooling plants that help to keep you cool under the scorching sun.

During our trip to the District Cooling System (DCS) facility at Marina Bay Sands, we were led to the basement where chiller plants produce cold water for distribution to various buildings in the Central Business District.

You see, it works like this: The DCS chiller plants operate during the off-peak period (11.00pm to 7.00am) when the electricity tariff is cheaper, to produce ice which is then stored. This ice is then melted during the peak period to chill the water that is pumped through the air-handling units to cool the building. So by leveraging on the different pricing of electricity, building owners are able to reduce their operating cost. This is, in every sense of the word, so cool, right?

This fascinating study trip was indeed an eye-opening experience that brought our textbooks to life!



Kenneth (right) at the DCS facility

A GREEN QUEST

Four students from the Diploma in Integrated Facility Management (IFM) embarked on an audacious quest to help their former secondary schools to attain the “Green Mark” award for environment-friendly buildings.

Learning that there is a requirement for all Singapore schools to obtain a “Green Mark” certification by 2020, and that only 6 of them had so far achieved it, four IFM students decided to take on the challenge of “greening” their alma mater as part of their final year Major Project.

In April 2015, three secondary schools agreed to join the students on this green journey. It involved a painstaking environmental audit of each school — taking into account factors such as room temperature, noise levels, the amount of greenery and recycling policies. Shortfalls were then addressed and rectified, before a final assessment was conducted.

In November 2015, Admiralty and Peicai Sec Schools were rewarded with the Green Mark (Gold) award, while Beatty Sec School clinched the prestigious Green Mark Gold^{plus} award — the second Singapore school to have done so.



IFM students with a green passion:
Wen Xin, Mohd Iqbal, Shi Hui, and Yan Zhen



Checking the noise level
in a staff room



Thrashing out the shortfalls with the
school's management

AN AIRCRAFT MODEL



By Natalyn Guam

With the bright spotlights trained on his muscular body, he troops down the runway as hundreds of pairs of eyes focus on his every move and high definition cameras capture every twitch of sinew on his well-built 1.87m frame.

Meet **Rayner Lim**, a part-time model and MediaCorp actor who handsomely juggles the pressure and stress of showbiz with the heavy demands of an Aerospace Electronics diploma course.

The aspiring 19 year-old has acted in 10 MediaCorp drama serials to date, including the Channel 8 favourite, "The Dream Makers 2" in which he plays "First Prince" alongside celebrity Ian Fang.

So passionate is Rayner about showbiz that the former Damai Secondary School student had even "risked" his 'O' levels to participate in a local 2014 production by Tay Ping Hui, Meeting the Giant, a movie centering on basketball.

In 2015, he cut an awesome figure on the runway as one of the male chaperons for The New Paper's "New Face" competition, providing arm candy for aspiring young babes who clung to his bulging biceps as they sashayed their way into the judges' hearts.

So, what's the secret of his commanding stage presence? "You need to be confident in both your body and mind, to be able to perfect your pose," advises the charismatic model, who gets paid up to \$500 per assignment.

Surely, a guy of his stature would have his fair share of female admirers. "No," blushes the modest young man, who is single (but unavailable). "For my 18th birthday, a female artiste gave me a peck on my cheek, and that's about all," he adds (if you believe him!).

During a talent hunt for the Channel U reality show "Hey Gorgeous" in September 2015, Rayner was easily spotted on campus. "It was really memorable as my classmates were cheering me on," he recalls.

Despite having an eye on a showbiz career, Rayner feels that getting a diploma is important, as it provides a strong backup in case things don't work out. "I chose to specialise in Aerospace because I am fascinated with aircraft," he explains.

"Anyway, a model and an aircraft have something in common — they both operate on the runway," he chuckles.



Rayner (in shirt No. 7) with the cast of "Meeting the Giant"

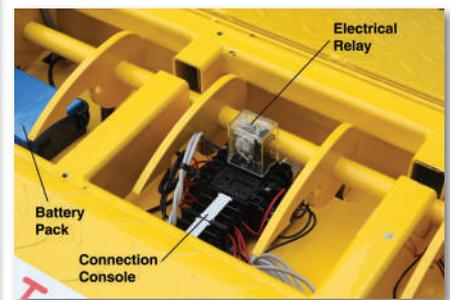


Rayner (in front) with his Aerospace classmates @ TP

PUTTING THE BRAKES ON ERRANT DRIVING



A timely invention by two students from the Diploma in Business Process & Systems Engineering promises to enhance homeland safety in Singapore, amidst heightened security concerns today.



The Speed Sensitive Spike (SSS) Ramp, the first of its kind ever invented, will activate metal spikes to puncture the tyres of a getaway vehicle and bring it to a stop at police road-blocks.

Unlike existing police spike ramps that need to be activated manually — which is not only slow but may also endanger the officer who activates it — the spikes of this SSS Ramp will be activated automatically if the approaching vehicle exceeds a pre-set speed limit.

Portable and mobile, the SSS Ramp can be loaded into a police van and be deployed within 5 minutes, unlike existing ramps which are often mounted permanently on the road.

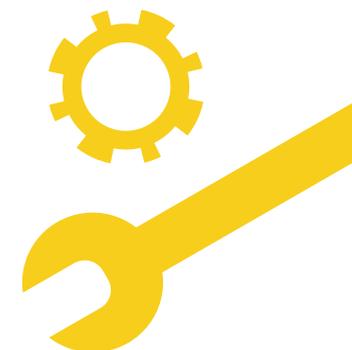
The 2 ramps — a left and right one — when aligned correctly, can fit the axle width of any common vehicle, from a small car to a big lorry.

The project was the only one among 66 participating entries which won a Gold award at the annual Security Awareness for Everyone (SAFE) competition organised by the Ministry of Home Affairs on 13 Nov '15.

How it works

There are 2 sensors on each ramp that detect the presence of a vehicle passing over them. Based on the difference in time when the first and second sensors detect the vehicle, the control circuit then calculates the speed of the vehicle. If the pre-set speed limit is exceeded, the control circuit then sends a signal to the 2 solenoids, which in turn launches all the spikes on the ramp.

The sensors and solenoids are powered by a battery pack inside the ramp, which can last for up to a month on a single charge.



Inventors of the SSS Ramp, Amanda (left) and Celeste



HE LIVES TO LEAD



By Natalyn Guam



Receiving his Sword of Honour from Minister Lawrence Wong

Digging a trench in pitch darkness, going without sleep for several nights, running a mile carrying your buddy in the pouring rain, and marching on despite being totally fatigued — **Lee Jia Wei** endured all these for 11 months and came out top.

The resolute 20 year-old 2nd Lieutenant, who is currently an Operations Officer at the 23rd Battalion Singapore Artillery Unit, was also the “Platoon Best Trainee” during his Basic Military Training, before continuing his journey in Officer Cadet School, where he achieved the Golden Canon Award and was one of three trainees awarded the Sword of Honour.

How did he do it? “You must give your best and put your heart into everything you do,” advises the former Seng Kang Secondary School student. “I do not believe in being a *Chao Keng* (army slang referring to those who skive or feign illness),” he adds.

Even today, Jia Wei continues to draw motivation from an incident which happened in 2014 when he was the Engineering Studies Club (ESC) President and de facto leader of the student body: “I remember during the TP Open House, we were told not to cheer as the school management did not want to “scare” the visitors. However, I made the overriding decision to allow my team members to continue cheering, although at a controlled volume, as I strongly believed that we should

let the visitors feel the culture and vibrancy of our School,” he recalls.

That turned out to be an excellent decision, with social media being subsequently flooded with positive comments from visitors who said they had felt very welcomed by the warm School culture. “I felt such a great sense of achievement then!” he exclaims.

Jia Wei, who has secured a place in the Bachelor of Engineering (Sustainable Infrastructure) degree programme at SIT, has signed on with the SAF. “When I have earned enough, I would like to sponsor some Cambodian children in their education,” says this man with a heart of gold.



Flashback: Jia Wei (front) helming his ESC team

TEMASEK AVIATION ACADEMY OPENS



Temasek Polytechnic has moved the national SkillsFuture initiative a step forward with the launch of its Temasek Aviation Academy (TAA) on campus — a facility dedicated to the training of diploma students and working adults to meet the manpower needs of the rapidly growing Aerospace and Aviation industry.

The 6,000 m² facility — the largest dedicated aviation and aerospace training facility in Singapore — comprises aircraft technical training workshops, a training hangar with a Hawker Siddeley 700A private jet, unmanned aerial vehicles (UAV) development facilities, a closed-looped wind tunnel, full-motion flight simulators, and a Virtual Reality experience studio, bringing together the best of TP's Aviation and Aerospace Engineering capabilities into an integrated training outfit.

The Academy was officially opened by Ms Josephine Teo, Senior Minister of State for Transport, on 8 Jan '16.

Mr Boo Kheng Hua, Principal and CEO of Temasek Polytechnic, said: "The real significance of the Temasek Aviation Academy lies in the embodiment of a training philosophy that is focused on skills deepening and life-long learning."

ENGINEERING DIPLOMA COURSES



- 3D Interactive Media Technology
- Aerospace Electronics
- Aerospace Engineering
- Aviation Management & Services
- Biomedical Engineering
- Business Process & Systems Engineering
- Clean Energy
- Computer Engineering
- Electronics
- Green Building & Sustainability
- Infocomm & Network Engineering
- Integrated Facility Management
- Mechatronics
- Media & Communication Technology
- Microelectronics

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- Electrical & Electronic Engineering Programme
- Mechatronics & Aerospace Programme

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