

# ENGINEERUS

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 **Temasek**  
POLYTECHNIC



# HOW TO DO WELL IN A POLY

With increasing competition for the best jobs and university places today, doing well in a polytechnic is vital for those pursuing a diploma. **ENGINEERRUS** sums up 5 key things that a student entering a Poly should know in order to do well academically.



## 1) Understand GPA

Grade Point Average (GPA) is generally taken as the barometer of how well you do academically. It is determined by the grade that you obtain for each subject.

Grade	Grade Points	Grade	Grade Points
Z	4	C	2
A	4	D+	1.5
B+	3.5	D	1
B	3	P	1
C+	2.5	F	0

Z = Distinction, P = Ungraded Pass

In addition, different subjects are allocated a different number of credit units, so your GPA is computed as follows:

$$\text{GPA} = \frac{\text{Sum (credit units X subject grade point)}}{\text{Sum (credit units for a subject)}}$$

Your cumulative GPA (cGPA) is the “accumulated” GPA for your entire 3 years in Poly, and it is the main criteria for admission into universities. Depending on the university and degree programme which you apply for, you could earn a place in one of our local publicly-funded universities with a cGPA of at least 3.4; for the more popular universities and courses, you might need a cGPA of 3.8 to stand a good chance of getting in.

## 2) Be consistent

Remember that your cGPA starts counting from your very first semester, so you need to work hard right from the start, otherwise it would be difficult for you to pull-up your cGPA in your second or third years. After each semester, your cGPA will be updated, so you should use

it as an indication of how much you need to improve for the remaining semesters.

You should also apply this consistent approach in your daily work — keep up with your lessons, and clarify your doubts with your lecturers as soon as possible; do not allow the doubts to pile up until exams come along!

## 3) Strive for every mark

A single mark may make the difference of one grade, which means a difference of 0.5 grade points, which in turn affects your cGPA. So strive for every single mark! That little bit more effort which you put in for your assignment could well turn out to be the winner.

## 4) Avoid Ungraded Passes

You may get an ungraded pass (“P” grade) if your attendance drops below the mandatory level — usually 85% attendance — regardless of how well you perform in that subject. A “P” grade is also awarded if you fail a subject, “repeat” it the following semester, and then pass it. Ungraded passes not only carry the lowest grade points, but they are also not seen very favourably by employers, so you should avoid it at all cost. Needless to say, you should avoid getting an “F” grade in the first place.

## 5) Go easy on CCAs

Co-curricular activities (CCAs) give you the chance to pursue your interests — whether in sports, the arts, or in service-oriented groups — as well as to make new friends and enjoy the variety of student life. However, do not go overboard in your CCA involvement, because there is always an “opportunity cost” — the more time and energy you spend on CCAs, the less you will have for your studies. Always ensure that you strike a balance between studies and CCA. Remember that CCAs alone will not earn you a place in university.



Note: The above information applies to TP School of Engineering; other institutions may have slightly varying practices.



# WERE YOU HERE?

About a hundred secondary school students visited our School of Engineering on 19 & 20 Oct '17 as part of the Applied Studies Experience, attending workshops to pick up Engineering-related skill-sets.

The event aimed to give prospective students an idea of the polytechnic's practical learning environment, while allowing them to check out the campus facilities and have fun too! Were you one of them?



Damai Sec School



Meridian Sec School



Geylang Methodist Sec School



Tampines Sec School



Pasir Ris Crest Sec School



# ENSURING AVIATION SAFETY

Students from the Diploma in Aviation Management & Services (AMS) won the Gold award in the Aviation Safety Competition, showing why their diploma course continues to be the best aviation diploma programme in Singapore offering the most industry relevant curriculum and training.



Design an optimum flight schedule and an aircraft maintenance programme for an airline with 20 commercial aircraft flying an average of 5,000 hours a year to various destinations, so as to optimise the availability of aircraft while ensuring safety and keeping cost low — that was the challenge thrown to contestants at the annual Aviation Safety Competition held on 31 Oct '17.

The AMS team's winning proposal included using Boeing 777-200ERs which provide the best compromise between cost and performance, hiring reputable aircraft maintenance companies with good safety and regulatory compliance records, and introducing a periodic "phased check" maintenance routine at specified stages in an aircraft's operational lifespan to reduce the aircraft's ground time.

## MODELLING THEIR FUTURE

Engineering students take home an array of awards in the annual Building Information Modelling (BIM) competition.

Tasked with conceptualising a design for the redevelopment of two blocks in the BCA Academy, a team of students from the Diploma in Green Building & Sustainability (GBS) designed a wedge-shaped module behind a complex structure using computational analysis, design and optimisation. Their design won them the Bronze award.

In the BIM Shootout event, an individual speed contest in which participants are required to use Revit software to replicate a given building model within 2 hours, Yeo Jin Ling, a final-year student from the Diploma in Integrated Facility Management (IFM), clinched the Silver award in the "Mechanical, Electrical & Plumbing" category, while four other IFM and GBS students took home Merit awards.

The students received their awards on 24 Oct '17, in conjunction with the national Built Smart Conference.



The GBS team with a model of their design



Yeo Jin Ling with her coaches



# AN ENCOURAGING FEAT

**Students from the Diploma in Clean Energy (CER) design a machine to promote recycling, winning an Encouragement award in the Greenwave Environmental Care competition.**

Recycling bins abound, but do many people use them? Probably not. That is why a team of CER students designed the “Artificial Stimulator Recycling Machine”.

The machine is equipped with sensors to verify the material — paper, plastic or metal — of the item deposited into the respective chambers. If the material is verified to be correct, the item is then shredded and dropped into the corresponding bin inside the device. However, if it is of the wrong material, the item is rejected and dispensed back to the user via an outlet.

To motivate users to recycle their unwanted items, the machine is linked to a “catch me” toy dispenser, and for each item correctly recycled, the user gets one attempt to pick up a soft toy.

The invention won the students an Encouragement award in the annual Greenwave Environmental Care competition held on 26 Nov '17.



## MAKE ME SMARTER!



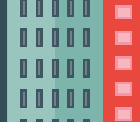
**Students from the Diploma in Integrated Facility Management (IFM) propose value-adding features to make a building smart, winning the Bronze award in the 24-hour Challenge.**



They were challenged to make a building smart by leveraging on technology to enhance comfort, convenience and the quality of life for occupants while being environmentally sustainable at the same time.

Working through the night, the IFM team proposed the use of smart lighting that is able to detect the presence of occupants in a space, smart parking which notifies motorists of where the empty parking lots are via a mobile app, as well as a rain harvesting system to collect, store and channel water for various uses.

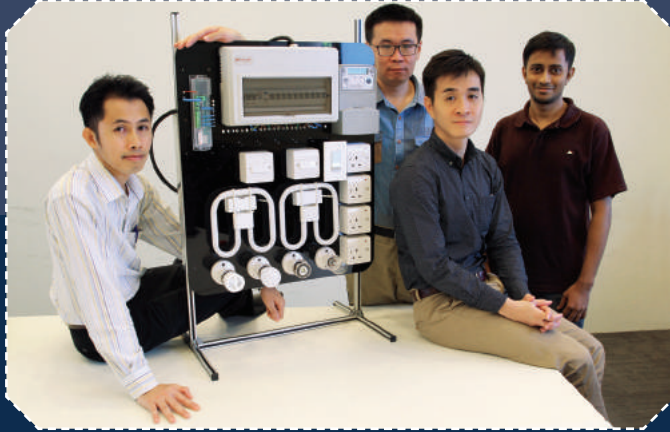
Their proposal won the Bronze award among 8 participating teams in the 24-hour Challenge held at SP on 5 & 6 Oct '17.





# INNERGISING INVENTIONS

**Temasek Polytechnic (TP) staff clinch a Gold and a Silver award in the MOE Innergy Awards competition.**



*The smart team (from left): Chaw Poh (IIT School), Gu Cheng, Kian Hoong and Supun*



*The blood testing experts (from left): Ling Ling, Willie, Ngee Poh and Fu Yi*

The “Smart Distribution Board”, invented by staff from TP’s Clean Energy Research Centre, is a mobile app that tracks the energy consumption of each appliance in the home, thereby allowing home owners to zero-in on inefficient devices. The invention won the Gold award in the MOE Innergy Awards competition held in September 2017.

In the same competition, another team of researchers from TP’s Microelectronics Centre earned a Silver

award with their automated system for checking the level of procalcitonin in a patient’s blood. Since a high level of procalcitonin in the blood is a symptom of infectious diseases such as sepsis, this new system facilitates diagnosis and treatment of the diseases.

The competition aims to recognise innovative projects done by staff in tertiary institutions whose inventions have brought about significant benefits.

## ONE BELT, ONE ROAD... ONE BRONZE

**How would you promote integration among countries in the region, so as to facilitate China’s “One Belt, One Road” initiative? Students from the Diploma in Business Process & Systems Engineering (BZE) had the answer.**

Taking part in the inaugural First International University Innovation competition held in Beijing, China, on 4 Jul '17, BZE students were given 5 hours to conceptualise an innovation which could promote co-operation among countries in China’s “One Belt, One Road” economic region.

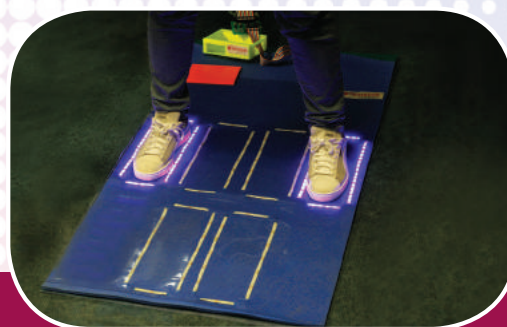
Participants from three countries were grouped into a team. Together with their counterparts from China and Hong Kong, the BZE team members proposed the use of a mobile messaging app, called “Connectivity”, which would transcend cultural barriers and provide a common platform for people from various countries to communicate. They won the Bronze award.



*BZE team members (facing camera) with their team-mates from China and HK during the competition*

# STANDING OVATION

Are you suffering from pain in your back, legs or feet? Now, you can find out if there is a problem with the way you stand or balance on your feet!



The "Interactive Body Balance Training System", an electronic exercise mat developed by students from the Diploma in Infocomm & Network Engineering, will be able to tell whether you have problems in standing and balancing. You can also evaluate your dexterity by following the foot-stepping sequence for various dance moves on a TV screen.

Foot pressure distribution is tracked by pressure sensors on the mat, while upper body swaying is

detected by the built-in accelerometer and gyroscope in a smart mobile phone strapped to your body. All the results are displayed in real time on a mobile app.

The project was one of 5 selected to receive the Lee Hsien Loong IDM (Interactive Digital Media) Smart Nation award on 17 Aug '17.

## DRIVERLESS WHEELCHAIR

Students from the Diploma in Business Process & Systems Engineering (BZE) propose a business idea to market their invention, the Smart Mobility Wheelchair (SMW).

We have driverless cars. And now, a driverless wheelchair.

Especially useful for the elderly suffering from dementia or other memory-loss conditions, the SMW is a motorised wheelchair equipped with a receiver to detect the RF signals given off by transmitters that would be mounted on public amenities such as lampposts and traffic lights. These transmitters serve as "checkpoints" and allow the wheelchair to navigate autonomously to a pre-chosen location.

Additionally, this smart wheelchair is able to automatically follow a caregiver walking in front of it, tracked by 6 proximity sensors mounted on the front of the wheelchair.

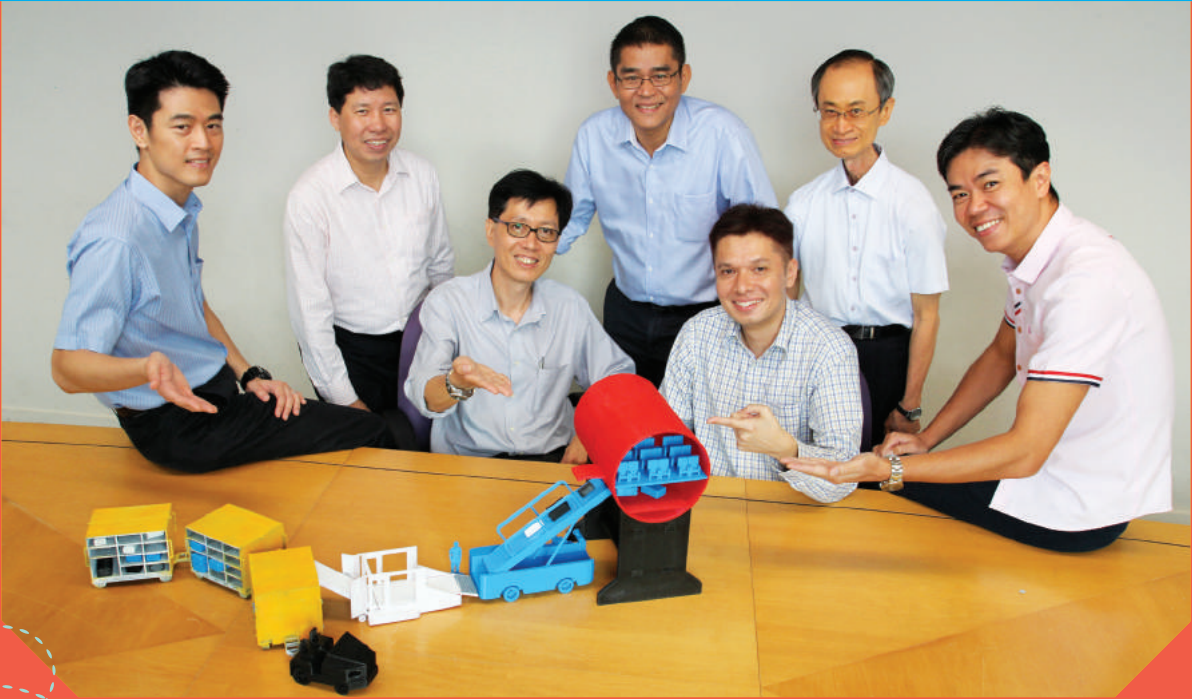
The students' business idea won them the Gold award in the Raffles Business Symposium business plan competition on 11 Aug '17.



# AUTOMATED BAGGAGE HANDLING SYSTEM



Engineering lecturers design automated system to facilitate baggage handling, promising quicker turnover time.



The aviation experts (from left): Andy, Jiun Sien, Keng Mun, Sumarni, Brandon, Cheng Siong and Edwin

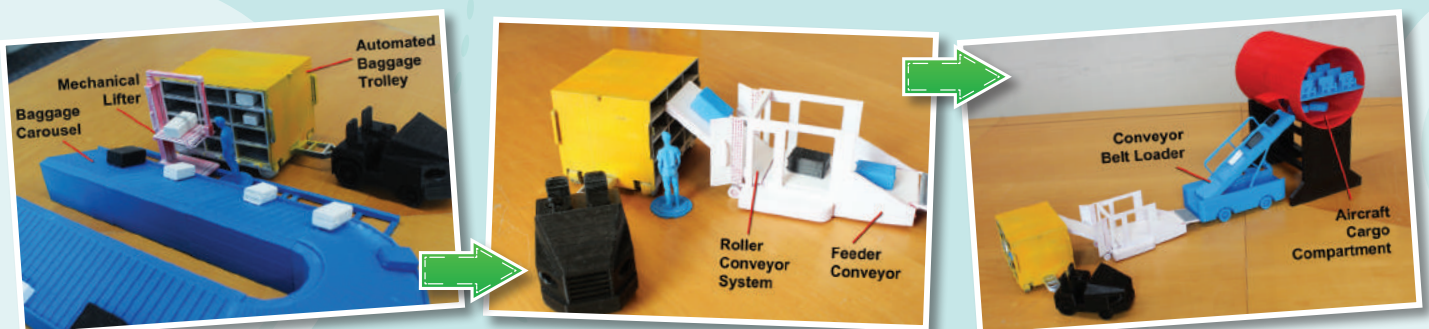
You may soon get to collect your luggage much more quickly after your flight.

A team of 7 lecturers from the School of Engineering, working with an industry partner (Petris Global Ltd), have designed an automated baggage handling system to make baggage loading and unloading quicker and easier.

This is how their system works: during loading of luggage, a mechanical lifter transfers bags from the baggage carousel onto an automated baggage trolley, which then loads the bags with its roller conveyor system onto a feeder conveyor. The bags are then transferred into an aircraft's cargo compartment using a conveyor belt loader.

The team members, who are lecturers of the Diploma in Aerospace Engineering, Diploma in Aerospace Electronics, and Diploma in Aviation Management & Services, emerged runner-up in the Aviation Challenge competition organised by the Civil Aviation Authority of Singapore.

In the competition, which started in 2014, contestants were challenged to improve productivity in baggage handling at Changi Airport. Out of 14 teams from the industry and academia, 5 were short-listed and each awarded about S\$2 million to develop their projects from September 2015 to July 2017. The projects by the 5 finalists were then evaluated by a panel of experts from the aviation community.



A 3D model showing how the system loads baggage



DBS  
PayLah!

# CASH(less) FOR CHARITY



From bubble tea and waffles, to henna hand-painting, photo-taking and fortune-telling, this year's Campus Care Network (CCN) Day carnival, held on 17 Nov '17, saw Engineering students setting up 65 stalls to raise funds for financially challenged students in Temasek Polytechnic (TP).

Significantly, about \$5,000 was raised at the half-day event without a single cent literally changing hands; all transactions were carried out using DBS' *PayLah!* mobile app. It was the first time that the biannual carnival went cashless, as part of a collaboration under which the local bank would donate \$1 to the CCN fund for every new *PayLah!* application downloaded by the TP community.

Principal and CEO Mr Peter Lam said: "As a teaching institution, we can lead the way in making e-payments a norm in Singapore by turning TP into a cashless campus".



# WE'RE OPEN, STEP RIGHT IN!



Thousands of secondary school students thronged the School of Engineering during its annual Open House from 4 – 6 Jan '18, to find out about its programmes, facilities and equipment, as well as to get a feel of the Temasek Polytechnic (TP) campus, known for its scenic environment that is conducive to both work and play.

Besides diploma booths where visitors could find out about prospective Engineering courses at TP, this year's Open House also featured dozens of interactive exhibits related to the field of Engineering as well as hands-on workshops for visitors.



## POLYS SHARE BEST PRACTICES

**Staff from four local polytechnics visited the School of Engineering to find out about our programmes, facilities and best practices.**



A learning visit, initiated by the Joint-Polytechnic Committee for Enhanced Teaching & Learning (Engineering Education) set up by the Ministry of Education in 2015, saw 23 staff from four local polytechnics visiting our Temasek Aviation Academy, including the aerospace development lab and aircraft training hangar, the TP-Lufthansa Technical Training (LTT) aerospace training centre and the 3D Simulation & Interactive Studio, on 26 Sep '17.

The visit is one of the collaborative platforms to promote the sharing of good teaching and learning practices for the benefit of students. Other knowledge-sharing platforms include mutual classroom observations and lesson debriefs as well as teaching and learning seminars.

# MY SPECIAL MISSION

Eleven students from the Diploma in Clean Energy (CER) rendered community service at Metta School — an educational establishment for autistic students — on 29 Sep '17, as part of their service learning programme. One of them, Lesley Sim, shares her experience.

By Lesley Sim Yu-Fang (CER)



*Lesley helping Ansel with his shopping assignment*

When we first arrived at Metta School, everyone was anxious as we did not know what to expect. We soon eased into the first activity of badminton which paired me with Ansel. Much to my surprise, we had great fun playing and laughing and I was more than happy to see the smile on his face.

After lunch, we took our Metta School partners on a shopping trip! Nope, not to Orchard Road, but to an NTUC Fairprice supermarket at East Point. Designed to enhance the basic life skills of the special needs students, the exercise required them to plan their route in the supermarket, pick out the items to buy, tick them off on the shopping list, and finally, pay for them at the cashier (where a special lane had been reserved for them).

Apart from occasionally forgetting to check-off his shopping list, Ansel had no difficulty navigating around and he could pick up the grocery items without even referring to his list!

In fact, our Metta School friends can easily go about their daily activities without much difficulty. They may be “special” but actually they are very much like you and me!



# YOU LIGHT UP MY LIFE

Engineering students are given the opportunity to participate in Overseas Community Projects (OCP), rendering their service to improve the lives of the less privileged in third world countries.



A group of 11 students embarked on an OCP trip to Cambodia from 12 – 18 Oct '17, installing solar lighting in Trang village where there is no electricity, and teaching basic vocational English to underprivileged students in the Aoral and Trang Centres.



Similarly, another group of 24 students did their bit for the less privileged at Sitio Manalpaac in Cauayan City, Philippines, from 22 Sep – 3 Oct '17. They refurbished the day-care centre, constructed water distribution pipes, planted shrubs, and also installed solar lighting to brighten up the lives of the villagers.

## FIGURE IT OUT...

AND WIN A LIMITED EDITION 16GB WOODEN THUMB-DRIVE!



What is the largest positive integer value for  $n$  such that the fraction  $\frac{7n+15}{n-3}$  is also an integer?

For example:

If  $n=8$ ,  $\frac{7(8)+15}{8-3} = \frac{71}{5}$  which is not an integer

If  $n=9$ ,  $\frac{7(9)+15}{9-3} = \frac{78}{6} = 13$  which is an integer

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](mailto:cheeseng@tp.edu.sg) with the subject title, "Engineerrus Maths Puzzle #15".

The first 10 correct entries drawn after the closing date **[30 June 2018]** will each win a limited edition 16GB wooden thumb-drive. Winners will be notified by email.

### ANSWER TO PUZZLE #14

The last digit for  $7^5 = 16807$  is 7.

By looking for a series of patterns, what is the last digit for  $7^{16807}$ ?

**Answer: 3**

We received a total of 131 entries from 45 secondary schools, out of which, 108 had the correct answer.

The following are the 10 winners picked by lucky draw.

#### Winners:

Mohd Zaki bin Surin (Chung Cheng High Yishun), S. Dhiraaj Naidu (Riverside Sec), Adrian Ebony Goenawan (Ping Yi Sec), Czarina Justine Singson Nillo (Fajar Sec), Loi Jun Hao (Geylang Methodist Sec), Muhd Ariffin Azali (Bedok View Sec), Tan Shirley (Yishun Town Sec), Zandra Phua (Swiss Cottage Sec), Zhao Chuan Wu Wei (Meridian Sec), Joy Tan En-Ting (Nan Chiau High).



# IT'S SEOUL MEMORABLE!

**A group of 29 students from the Diploma in Integrated Facility Management (IFM) went on a study trip to Seoul, Korea, from 23 — 28 Sep '17. One of them, Nur Alyn, shares her experience.**

By Nur Alyn Eliza bte Mohammad Sujai (IFM)

So you love K-pop, watch K-drama, indulge in K-fashion, and adore K-stars? Then why not take a 6D5N K-tour and watch your K-dreams turn to reality? Well, that's precisely what we did!

As part of our K-trip, we visited the scenic Gyeongbukgung Palace, built in 1395. We basked in its rich history and gawked at the unique architecture of the buildings, set against the majestic backdrop of the beautiful Mount Bugaksan and Mount Namsan.

At Lotte World theme park, the bright colours and bustling atmosphere got everyone's adrenalin pumping. Being able to go on thrilling rides (for which we had to queue, sometimes up to an hour for each attraction!) and eat delicious snacks was extremely memorable for most of us!

We then checked out the fashionable Dongdaemun Plaza. The beautiful facility, designed by the famous Zaha Hadid, was well-planned, with consideration given to both sustainability and aesthetics.

The highlight of our trip was the visit to Kyung Hee University, which boasts of being the first educational institution to be awarded the UNESCO Prize for Peace Education. (Trivia lovers, note this: the university counts Goblin's Gong Yoo, Big Bang's G-Dragon and EXO's Park Chanyeol among its notable alumni!)

There, we learnt about the university's 4-year Property Management & Facility Management degree programme — an extremely popular course in Korea — and had fun interacting with our Korean counterparts.

This study trip has indeed given us wonderful K-memories we will always remember.



*During an interaction session with Kyung Hee University students*



# NEW KID ON THE BLOCK

Lecturer conferred “Young Green Advocate of the Year Award” for her role in environmental sustainability.



Receiving the award from Mr Lawrence Wong, Minister for National Development and 2<sup>nd</sup> Minister for Finance

Standing in front of her class delivering a lecture, **Ms Joanne Koh Phuy Theng** is a picture of passive femininity. But don't be fooled by her demure appearance; this dynamic iron lady has a passion burning in her bones.

It is this passion that won her the “Young Green Advocate of the Year Award”, conferred by the Singapore Green Building Council and the Building & Construction Authority in September 2017.

Hardened by years of working in the industry, the former Projects Manager at CPG Facilities Management Pte Ltd used to don safety boots and helmet, scream at her manual labourers on the ground and get shouted at in return. She recalls how she was examining a broken ceiling one day, when at least a hundred pigeons suddenly swooped down on her, *kamikaze* style. “In the industry, you face different surprises everyday,” explains the certified Green Mark Facility Manager.

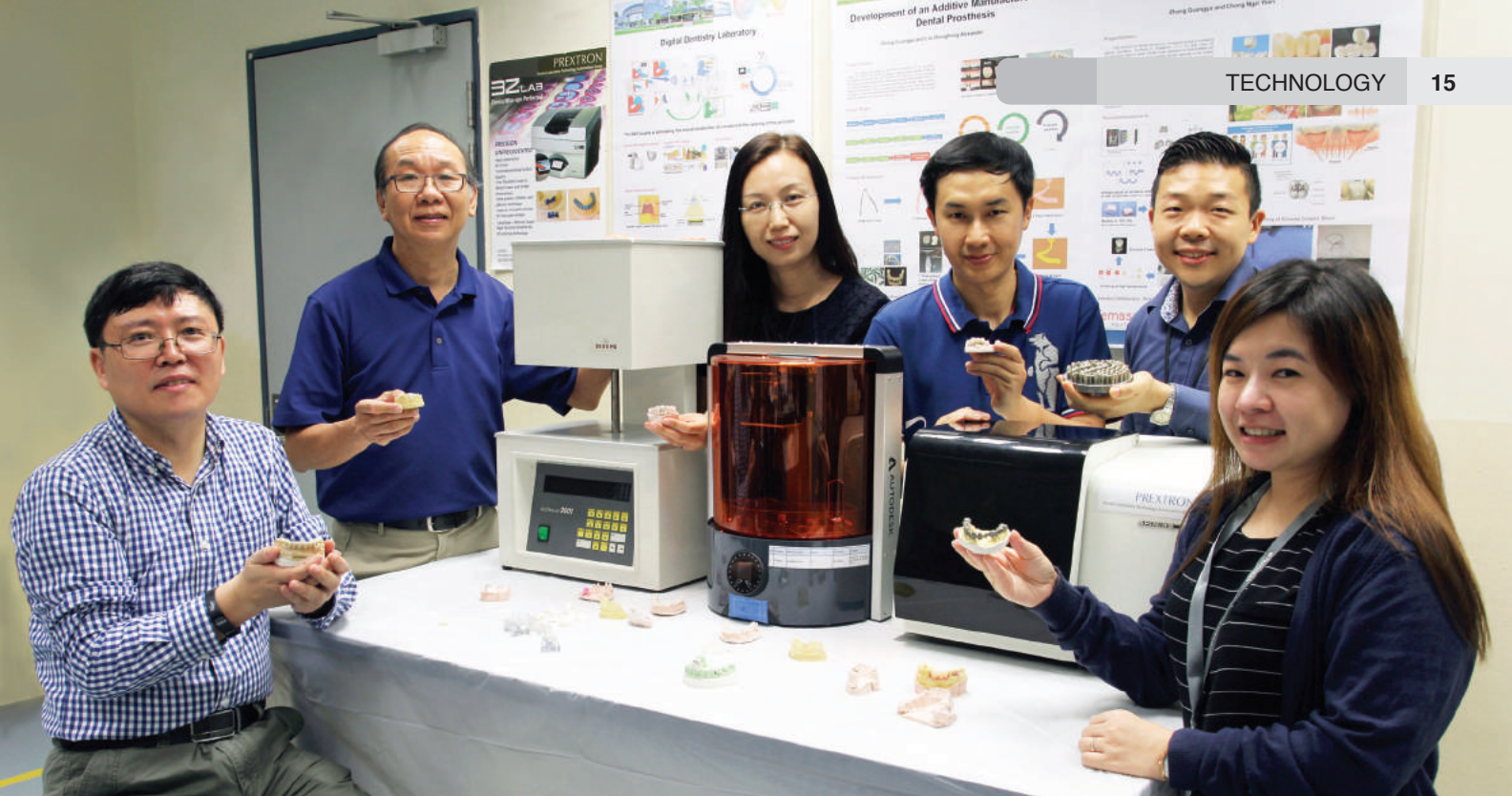
Today, the 33-year-old course manager of the Diploma in Integrated Facility Management (IFM), who joined TP in 2011, teaches her students about environmental sustainability. She initiated the “Back to School” programme in 2015, in which IFM students

help primary and secondary schools to obtain the “Green Mark” certification, and is championing the Green Mark certification of the TP campus, targeted to be achieved by 2018.

Explaining the charm of facilities management, which is her second love (her first love is her husband, of course), Joanne says: “I never stop being amazed at how the back end management of a building can be so invisible and yet affects everyone in the building.”



Joanne with her IFM smart lighting project students



The 3D dental crown team (from left): Dr Zhang, Peter (Prextron Pte Ltd), Dr Sun, Joo Kiang, Dr Liu and Jie Lin

## NO MORE TEETHING PROBLEMS

Researchers from the School of Engineering have invented a new way of making dental crowns and bridges that are cheaper, better and faster.

If you've done a dental restoration before, you would know that it takes more than a week for your dental crown to be ready, not to mention the fact that it will probably burn a hole in your pocket.

Now, with a new method of making dental crowns invented by researchers from the school's Microelectronics Centre, it's possible to get your crown on the same day, and at about half the price of a conventional crown.

This new method uses 3D printing, which also ensures that your crown fits better and is more comfortable.

### How is it made?

After the dentist takes a dental impression of the patient's tooth area, the resulting impression is then scanned using a 3D scanner. A 3D printer then "prints" out the outer shape of the required crown. This shape, made of wax, is then pressed into liquid silicone to create a mould. Liquid porcelain is then poured into this silicone mould.

In the meantime, another 3D printer "prints" out the inner shape of the crown to create a metal "skeleton", which is then inserted into the liquid porcelain and allowed to cure.

After the liquid porcelain hardens, the silicone mould around it is removed, and the crown is fired in a "kiln" at about 1,000°C. The beautiful crown is then ready.

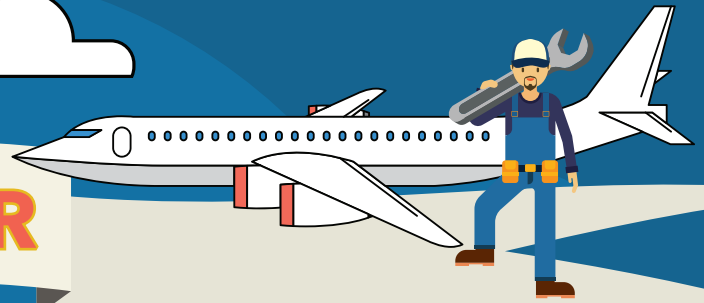


Model of a fitted crown



A silicone mould

# ONE STEP HIGHER



Ten graduates from the Diploma in Aerospace Engineering (AEG) and Diploma in Aerospace Electronics (AEL) are now a step closer to realising their dreams to be a Licensed Aircraft Engineer (LAE).

While working with aircraft maintenance companies Hawker Pacific Asia Pte Ltd and Bombardier Aerospace Services S'pore Pte Ltd, these trainees completed Part 2 of their Aircraft Maintenance Licence Training (AMLT2), conducted by Temasek Polytechnic (TP) on an "Earn & Learn" basis under the SkillsFuture framework.

They are the first batch to have completed the 8-month AMLT2 programme, which is a continuation of the Part 1 modules they had done when they were full time AEG or AEL students in TP.

They received their certificates at a graduation ceremony held on 12 Jan '18.

## 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
- Integrated Facility Management
- Mechatronics
- Microelectronics

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## SPECIAL PROGRAMMES

- Common Engineering Programme
- Electrical & Electronic Engineering Programme
- Mechatronics & Aerospace Programme

## PUBLICATION ENQUIRIES

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