



A . P . U
ASIA PACIFIC UNIVERSITY
OF TECHNOLOGY & INNOVATION

SCHOOL OF ENGINEERING

ENGINEERS INSIGHT

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Contents

Who Are Engineers?

Go Green

ESIG Seminars

Team Engineering

ESIG Industrial Visits

ESIG Appreciation

Academic Staff &
Students' Articles

SoE Student Life

FYP December 2012

SoE Competitions

Photo Gallery

'Engineers Insight' is a quarterly issue by the School of Engineering for the reading pleasure of the staff and students allowing for knowledge sharing and capturing of events for the benefit of engineering education

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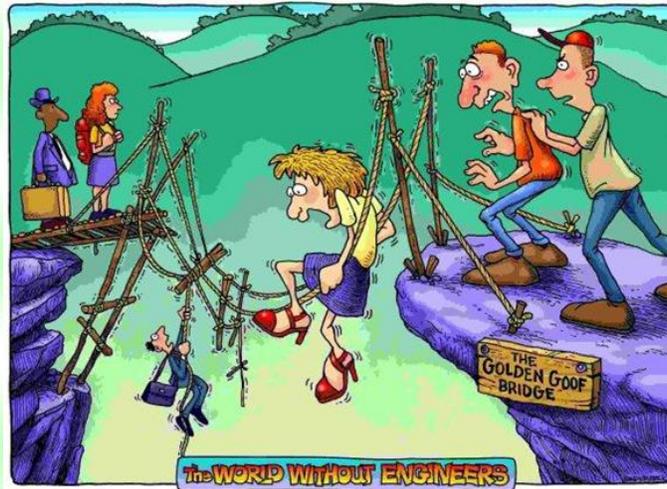
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Who Are Engineers?



<http://www19.homepage.villanova.edu/randy.weinstein/joke/joke6.htm>

We all know what engineering is. Yes correct, it is stuff that engineers do. It sounds as simple as that but where did the word *engineer* pop out from?

The word *engineer* is derived from the Latin roots *ingeniare* which means to contrive or devise. The other Latin definition also commonly used is *ingenium* which means cleverness. In short, engineers devise using their cleverness. How does it start? Basically there should be a problem in existence. The problem at first instance will require a solution and that forms the requirement in totality.

Thus, having a problem means needing an engineer, having a requirement also means needing an engineer. Engineers of the world today exist to solve a problem or serve a requirement. It's that simple. For easy understanding, engineering is where you solve problems. To add a bit more to it, engineers use technical, as well as scientific knowledge in order to make judgments. By using their imaginations, they come up with solutions to problems either new or old. It is by using the application of technical and scientific knowledge that engineers put judgment, imagination and reasoning to work in order to come up with new solutions to human problems or new ways to solve old problems. So, if that has left you feeling a bit hazy, the best way to summarize all of this is that engineers are problem solvers.

Where does the innovation part fall in? Any new solution to a problem or a feed as a requirement is the innovation itself. When you create something new, you hence have 'innovated'. As we evolve, many problems have been solved but it is us humans who solve them and create new ones as well. The only good thing is that engineers will always be required to solve or provide a requirement. You cannot run away from this theory as every aspect of life in motion requires an engineering action. The computers we use, the seat we sit on, mugs which hold our coffee, cars that shuttle you home, the pleasant shower in the bathroom, the stove that cooks the dinners, the air-conditioning system that cools during sleeping hours or the alarm clock that wakes us up.

As long as a person solves a problem or serves a requirement, he or she has performed an engineer's duty. So why aren't we all engineers then? This is where the licensing for practice as engineer comes in. To be a licensed engineer, the local engineering authority or the likes of the Engineering Council or Board is the body that approves the license or authorizes the right to practice. In most cases, the route starts with a recognized engineering degree which leads to being a member of the body hence registering oneself as 'An Engineer' which eventually leads to the Professional Engineer pathway which is again endorsed by the council or any engineering professional body. Therefore, we may practice engineering in our daily lives but it does not mean we all licensed engineers. The engineering route to professionalism is tuned for allowing innovative engineering growth that is balanced within the limits of a safe living environment. Be innovative, be an engineer but most of all think and act for the safety of life and the environment.

By Dr. Vinesh Thiruchelvam

GO GREEN

Go Green

'Go Green' is an energy saving awareness within the School of Engineering which covers elements such as water, resources, travel and waste, to encourage both engineering students and staff on a wider appeal for a more positive engagement towards saving the planet. It is hoped that the campaign, will capture the imagination of staff and students by encouraging them to meet their 'Go Green' responsibilities.

To get you started, listed below are some of your potential 'Go Green' actions:

	Energy	Resources	Water	Travel	Municipal Waste	Construction	Food
1	Only switch on anything when required	Buy fresh produce, check production background	Drink filtered tap water not bottled water, stay away from plastics	Drive less, car pool or leave the car at home	Repair items	Insulate your home, check windows	Buy organic whenever possible
2	When completed, switch it off	Purchase recycled content items	Get dripping taps/pipes fixed	Use video or tele-conference methods	Avoid buying overly packaged items	Reduce your footprint by investing in renewable technologies	Buy seasonal fruit and vegetables
3	Consider energy labels when buying new electrical products	Print less, use paperless methods, go soft	Use water as required, switch off the tap while shaving	If buying new get a hybrid	Reuse and recycle items	Use less A/C, opt for energy saving fans	Support local produce, products
4	Maximize daylight and natural ventilation	Only purchase what you need	Turn off water when lathering; turn back on to wash soap off	Use public transport systems	Segregate your trash – plastic, paper, waste	Decorate with water based paints	Cook more meals at home
5	Monitor and manage your usage	Have a meat-free day	Collect rainwater for grounds and gardens, use it for watering plants	Walk more, it's free and healthy	Don't drop rubbish everywhere	Fill your accommodation with air, open your windows	Cook fast, use less electrical appliances

A few green facts that everyone should know...

- **Q. How much energy does it take to make 30 cups of coffee?**
A. The same amount of energy wasted by leaving the office printer on standby all night.
- **Q. How much energy does it take to laser print 800 pages?**
A. The same amount of energy wasted by leaving your printer on all night.
- **Q. How much energy does it take to microwave six dinners?**
A. The same amount of energy wasted by leaving your PC monitor on all night.
- **Q. How much CO₂ does it take to fill a public bus?**
A. The same amount of CO₂ wasted by leaving your computer on all night for a year.



SEMINARS & WORKSHOPS

‘Elegant Research Article and Report Writing with LaTeX’

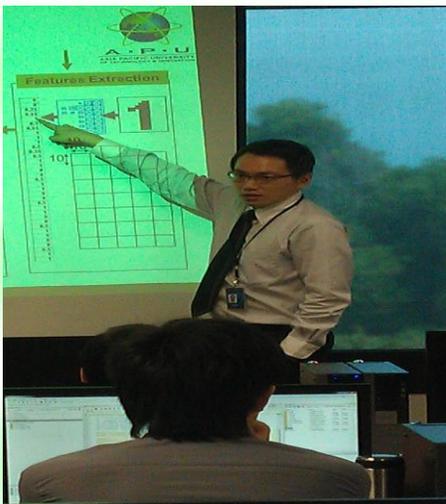


The complexities of submitting a paper for publication has always been a tedious process as all receiving journals or conferences have their own document structure or format, hence an easy method to publication was required. A seminar on ‘Elegant Research Article and Report Writing with LaTeX’ was presented by Dr. Lai Nai Shyan, on October 5, 2012 opened that required window. The session was attended by 35 students and 8 members of academic staff. For the first time in the school’s history it was broadcast online to another university being that of Erode Sengunthar Engineering College in Erode, India. 1500 students and faculty members from India watched and interacted online with APU on that day.



‘Artificial Intelligence and Implementation with MATLAB’

The increasing importance of soft computing (neural networks, fuzzy logic and probabilistic reasoning) in artificial intelligence has enhanced the importance and popularity of the MATLAB software usage. To develop the skills further a seminar on “Artificial Intelligence and its Implementation with MATLAB” was presented by Dr. Thang Ka Fei on November 7, 2012. 35 students and 4 member of academic staff attended the seminar. The MATLAB-based toolboxes provided a high-level set of functions that could be used by students to understand and apply to practical problem-solving tasks. The image processing toolbox, the neural network toolbox, and the free toolboxes for genetic algorithms were excellent tools for working with the concepts in the textbook. The use of the built-in graphics and visualization capabilities in MATLAB supported concept understanding and motivated student interest in their assignments.



Role of BEM & IEM to Graduate Engineers



Students are taught about engineers in the society of today but many still want to know about the engagement with the engineering authorities and roles that the professional bodies play in the development of a young engineer. APU was fortunate enough to have the Institute of Engineers Malaysia (IEM) on behalf of the Board of Engineers Malaysia (BEM) give a talk on the “Role of BEM and IEM to Graduate Engineers” which was presented by Dr. Vinesh Thiruchelvam, SoE & Engr. Navinderan, IEM, Malaysia, on November 7, 2012. 253 students and academic staff attended the session.



Introduction to LTE for 4G

What is 4G or LTE and why does it matter? Living in a fast moving society mobile communication has become more dependent on as never before. This also meant that everything has to be faster communication wise. Everyone has heard the claims that 4G LTE is faster. It allows a user to download more pictures, consumers watch movies without disruptions and it also allows for video chat on the go in a much more efficient manner that previously done before. In general the SoE students at APU were unaware of 4G LTE except for knowing that YTL Bhd, was the 1st in the world to launch this technology. To help uncover the 4G LTE mystery, a seminar entitled “Introduction to LTE for 4G” was presented by Mr. Wong Fook Loong, Technical Director, Universal Cellular Engineering Services Sdn. Bhd., on December 13, 2012. 70 students and 8 members of academic staff attended the seminar. LTE, short for Long Term Evolution, is considered by many to be the obvious successor to the current generation of UMTS 3G technologies, which are based upon WCDMA, HSDPA, HSUPA, and HSPA. LTE is not a replacement for UMTS in the way that UMTS was a replacement for GSM, but rather an update to the UMTS technology that will enable it to provide significantly faster data rates for both uploading and downloading.





TEAM ENGINEERING

Design Analysis of Analogue Electronic Circuits



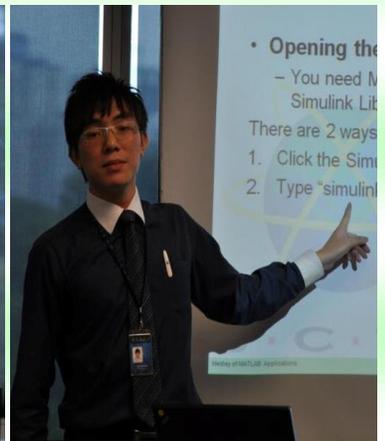
As part of SoE's in-house experts continuous knowledge sharing process a one day workshop on "Design Analysis of Analogue Electronic Circuits - Jargons to Joy" was conducted by Team Engineering in association with ESIG on May 9, 2012. Mr. Shankar Duraikannan, Mr. Lioe De Xing, Mr. Tan Gim Heng & Mr. Chandrasekharan Nataraj were the academic staff presenters at the workshop. 78 students had participated in the seminar which was well received by the student group to the satisfaction of the academic team.



Medley of MATLAB Applications – Session I



The two day workshop on "Medley of MATLAB Applications – Session I" was conducted by Team Engineering in association with ESIG on July 21 & 28, 2012. Mr. Shankar Duraikannan, Mr. Lioe De Xing, Mr. Syed Mohd Bahrin, & Mr. Chandrasekharan Nataraj were the academic staff presenters, 70 students from the school of engineering participated in the workshop.



Medley of MATLAB Applications – Session II



The two day workshop on “Medley of MATLAB Applications – Session II” was conducted by Team Engineering in association with ESIG on September 8 & 15, 2012. Mr. Shankar Duraikannan, Mr. Lioe De Xing, Mr. Sathishkumar Selvaperumal, Mr. Chandrasekharan Nataraj & Mr. Nasrodin Tabara Mustapha were the academic staff presenters, 70 students of the school of engineering participated in the workshop. Session II was completed and we look forward to a medley of MATLAB sessions for 2013.



Analysis of Circuits – Signals and Systems Based Approach



Power and electronic engineering is all about the formation of circuits. They shape up the entire connectivity of an electrical or electronic equipment, hence an in depth understanding is useful. A two day workshop on Analysis of Circuits – Signals and System Based Approach was held on December 7 & 8, 2012 with 35 student participants which included 6 participants from Kuala Lumpur Metropolitan University. Ms. Jacqueline Lukose, Mr. Shankar Duraikannan, Mr. Sathish Kumar Selvaperumal, Dr. Pooria Varahram & Dr. Thang Ka Fei were the presenters at the seminar. The inclusion of the participants from an external university was good towards students sharing knowledge. It was also good recognition for the SoE academic staff.





INDUSTRIAL VISITS

MAS Maintenance Facility, Subang, Selangor

The airline industry has always been an exciting industry with many kids dreaming of piloting a plane or even designing one. ESIG organized a visit to the MAS Maintenance Management & Organization Exposition (MMOE) in Subang on October 4th 2012. 40 SoE students accompanied by 3 members of academic staff visited the facility. The MMOE serves to lay down the organizational structure, responsibilities, resources, policies, processes and procedures in performing aircraft maintenance and management to the standards of the following:

- Malaysian DCA as an Approved Maintenance Organization & Air Operator Certificate (AOC) Holder.
- European Aviation Safety Agency (EASA)
- FAA Foreign Repair Station Approval in accordance to Federal Aviation Regulation (FAR)



Janamanjung Power Plant, Tenaga Nasional Berhad(TNB), Perak

Power is something so important in our daily lives and yet many actually don't know how it is produced but we love using it abundantly. SoE student were curious and the 36 students accompanied by 4 members of academic staff led by Dr Firas Ismail visited TNB Janamanjung Power Plant, Perak on October 17, 2012. They were fortunate to see with their own eyes an actual power plant in optimum operations. Manjung is a coal fired power plant with a max capacity output of 2.3MW utilizing three steam turbines. It burns 6 million tonnes of coal annually. The plant is touted as the first clean coal facility in Malaysia, and boasts of technologies that reduce emissions of harmful sulphur dioxide, nitrogen oxide, mercury and particulates.



International Greentech & Eco Product Exhibition-IGEM 2012

Setting the right pace for economic regeneration while addressing environmental issues, the Malaysian Government has successfully identified green technology as the emerging driver for sustainable economic growth. Coupled with the pledge by the Prime Minister of Malaysia to reduce the country's CO₂ emission by to 40% by the year 2020 during the UNFCC COP Meeting at Copenhagen, Malaysian industries have risen to embrace this challenge in a favorable policy environment and develop Malaysia into the green economy hub in the ASEAN region. Following the successful initiation of the International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM 2010) as the region's largest green exhibition and conference in 2010, IGEM is set to rack up another notch in its standing as a hotbed in creating a vibrant mix of opportunities to help spur industries and institutions to adopt green technology and boost eco-technological innovators in the field of eco-design, eco-materials, eco-products and low carbon Green Technologies. 25 students accompanied by 4 members of academic staff attended the 3rd International Greentech & Eco Product Exhibition and Conference (IGEM 2012) at KLCC, Kuala Lumpur on October 11, 2012.



Visit to Proton Manufacturing Plant, Shah Alam, Selangor



The PROTON Shah Alam manufacturing complex includes the original Main Plant and the smaller Multi Vehicle Factory (MVF). The plant contains a separate engine machining and assembly building within the complex where cylinder blocks, crankshaft and camshafts for the CamPro engine are machined and subsequently assembled. The casting plant situated in the industrial area near Glenmarie is able to produce up to 180,000 cylinder blocks, crankshafts and bearing caps annually. The Main Plant's capacity is 150,000 units per year while the MVF capacity is 50,000 per year giving a total capacity of 200,000 units per year. 40 students accompanied by member of academic staff visited Proton, Shah Alam on November 1, 2012.

Sector Focused Career Fair

36 students accompanied by members of academic attended the Sector Focused Career Fair, Cyberjaya on November 21, 2012.

Students were able to correspond with future employers and 2 were even lucky enough to get placements for their internship from DIGI Malaysia, at the fair.



Dream Edge Seminar – DES 2012, Kuala Lumpur



10 students accompanied by 3 academic staff attended the Dream Edge Seminar DES - 2012 on December 19, 2012. Our student, Vishali Batish (TP026441) won a Canon Power shot Camera in the lucky draw at the end of the seminar.



ENGINEERING COMPETITIONS - 2012

In 2012, SoE students took part in 3 major competitions which was a sign of engineering education growth within APU. The students not only showed talent, skills and determination but the most important fact was the ability to apply knowledge learnt and communicate excellently within a team. The SoE is proud of the 2012 Shell Eco Marathon team that was advised by Mr Syed Baharin. The group participating for the first time did exceptionally well in achieving 136km/hr in their eco-car. The Bosch 2012 competition team, under the guidance of Mr Alvin Yap, also performed way beyond expectations and have achieved a solid team commitment which has led them to re-build the car for further competitions in 2013. Lastly our Robocon 2012 team developed and delivered under tough circumstances with the leadership of Mr Suresh Gobee and M/s Vicky which allowed the SoE to build on the popularity of robotics engineering. APU and SOE salutes the teams and their academic advisors on their limitless efforts on their activities and results obtained.





APPRECIATION CEREMONY

An appreciation party for the outgoing ESIG office bearers of the year 2011-12 was held on November 16, 2012.



ESIG Office Bearers
October 2011 – September 2012

ESIG Office Bearers
October 2012 – September 2013



The Engineering Student Interest Group (ESIG) is now the School of Engineering student chapter. ESIG will embark on a defined pathway for 2013. The success of a student chapter can be as valuable as the curriculum in defining the quality of an engineering school or faculty. This success can be framed by the ability to: foster retention by building student camaraderie; develop leadership skills; and expand individual awareness of societal responsibility and personal empowerment. Chapter activities may enhance engineering principles, can involve students in complex projects requiring teamwork – from conceptualization to fruition, and provide interaction with professional contacts. These objectives can be realized through multiple means, including intercollegiate competitions, public outreach, and community service. Membership in student professional clubs in general is an integral part of many engineering students' university experience. Through these clubs, students are presented with multiple opportunities to work in teams, improve communication skills, acquire leadership abilities and build strong camaraderie with their classmates. The fact that student chapters continue to thrive on university campuses, regardless of the cultural changes each decade brings, provides a strong indicator of the value and importance of these clubs. The enduring quality of these clubs speaks to their usefulness and success. In this case, the number of awards the club has received does not solely define success. Rather, success is reflected holistically, by the quality of the learning experience that is provided through club membership. If you are an engineering student, preference is given to be part of the ESIG rather than to form individual groups as collectively we can build bigger, longer and faster together.

By Dr Vinesh Thiruchelvam

A Step Closer to your Dream Job



'How to land your dream job' by Jeffrey J. Fox

The workforce is more competitive than ever. There are many terrific jobs waiting for you out there; how do you stand out and be the one selected among the thousands who are trying to be at the same seat. From the book 'HOW TO LAND YOUR DREAM JOB' by Jeffrey J. Fox, here are some points to help you prepare a resume as a first step in landing your dream job.

Hirers (companies) expect resumes to represent one side of the candidate and embellishments in resumes. Since all the resumes look alike, regardless of the style – experience resume, chronological resume and functional resume, hirers always look for a resume that stands out from the rest.

The resume you are writing should address the two main purpose ; to be interesting enough to get you an interview and to reaffirm in a tailored way, after your interview, how hiring you can solve the hirer's problem or how the hirer's will benefit after hiring you in their company. Here are some points for a more unique resume.

1. A resume and a cover letter that is tailored and written for a particular company is the most effective resume. So, if you want to send your resume to 50 different companies, you should have a different tailored resume and cover letter for each of these 50 companies.
2. In your personal section you can creatively position your experience, you can imply great importance to your experience, but you cannot lie. For example if you worked as an intern and all you did was stuffing and sending questionnaires on the construction industry ; you can reword it as – responsible in implementing a market research exercise to identify new products and opportunities in the construction industry. You should not write 'Project manager for ABC advertising agency's study on the construction industry'.
3. Eliminate all self-serving descriptions. For example – passion for customer service, result oriented. Don't write this kind of cotton candy phrase. Be different.
4. Use facts, incidents and numbers to reveal your good qualities.
5. Concentrate on the latest or last three years experience that matches the job needs of your targeted company.
6. The only acceptable job objective is to directly or indirectly help the company profit and get the customers. So, write an objective that resonates with the job applied for.
7. Your resume should clearly answer the question 'Why should the company hire you and consider you from the rest'. Keep this in your mind from the moment you start drafting your resume.
8. Never write a resume that exceeds 2 pages in length. Resumes longer than 2 pages give an impression that you are overly impressed with yourself. So, be specific and keep it short.
9. Write a follow up letter to ensure that the particular company received your resume and ask for the status of your application. This indicates that you are interested and looking forward to being employed by the company.

By Ms. Subhashini Gopal Krishnan

Silicon Quantum Dots - A Promising Avenue Towards The Realization Of Quantum Computers

Will we ever be content with the amount of computing power we have? Thirty years ago, Gordon Moore, the co-founder of Intel predicted that the number of transistors on a chip would double about every two years. His prophecy, more commonly known as Moore's Law, has not yet been violated with Intel currently capable of packing nearly two billion transistors on a single chip. However, it must be asked whether there exists a limit to Moore's Law.

The answer is yes. Absolutely, there is a limit. When the size of the transistors shrink to sub-nanometer scale or only a few electrons contribute to the current, quantum effects become apparent. Hence, to quench the thirst for more computation power in fields such as database searching, protein-folding calculations and climate forecast, quantum computing could provide a solution to this problem.

Nobel Laureate Richard Feynman foresaw the potential of nano-electronics and quantum information. The end result of a scaling down of transistor size is the quantum dots which have been proposed as an implementation of quantum computation.

Together with a research team in University of New South Wales (UNSW), Australia [1], Senior Lecturers of School of Engineering, Asia Pacific University of Technology and Innovation (APU), Dr. Lai Nai Shyan and Dr. Lim Wee Han have successfully developed and demonstrated a new technique for confining electrons in silicon quantum dots [2-3], paving the way for ultra-powerful quantum computer. More recently, published in the international journal *Physical Review B*, they are able to study the energy spectra of a few-electron silicon metal-oxide-semiconductor (MOS) quantum dot using charge sensing techniques [4]. The silicon nano-device is crucial in assessing the prospects of spin-based qubits. A qubit is a unit of quantum information.



Figure 1 Dr Lai Nai Shyan performing resist coating in a class ten semi-conductor nano-fabrication clean room [4]

To perform the experiment, expertise in semiconductor nano-fabrication and cryogenic electronic measurements are indispensable. Using cutting-edge fabrication technology, a silicon quantum dot nano-device can be produced as shown in Figure 2.

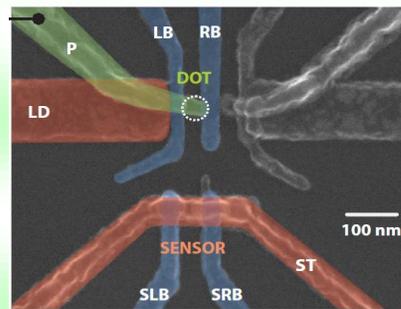


Figure 2 (Top view) Scanning electron microscope (SEM) image of a silicon quantum dot, with a charge sensor nearby.

It was fabricated using multilayer Al-Al₂O₃-Al gate stack technology. In Figure 3, a quantum dot of size ~30 nm x30 nm is formed in between B1 and B2 and is independently controlled by the plunger gate P.

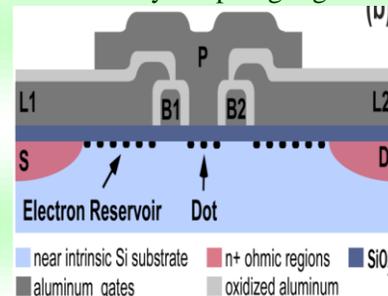


Figure 3 (Schematic cross-sectional view) A quantum dot is confined electro-statically in silicon using aluminum surface gates.

By applying a positive voltage on the lead gate L1 and L2, an electron accumulation reservoir is induced at the Si/SiO₂ interface. Electrons from the reservoir can tunnel on and off the quantum dot. At milli-Kelvin temperature measurements, the number of electrons in the quantum dot can be reduced one by one until zero. At the one-electron regime, the spin of the electron is manipulated to create a single qubit, a key building block for quantum computer [5].

There are plenty of research opportunities to delve into silicon quantum dots for quantum information processing. Dr. Lim and Dr. Lai envisage to set up semiconductor nanofabrication facilities at APU in the near future.

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By Dr. Lai Nai Shyan & Dr. Lim Wee Han

Keep Your Solar Panels Clean

Deserts are excellent places to install solar panels, where it is always sunny. However, deserts are dusty which require regular solar panel cleaning so the layer of dust will not stop the cells from absorbing sufficient sunlight. The efficiency of photovoltaic cells can drop due to additional factors such as dust & dirt. In order to maximize the power produced from the solar panel it is important to operate the panel at its peak performance. A study done currently is to introduce a smart system that enables a solar panel to clean itself and keep it at optimal efficiency is currently under way.

Effect of Dust & Dirt to Solar Panels Performance

Many methods of testing the performance of solar panels have been studied. However, an effective way of monitoring solar panels performance is to plot its I-V & P-V characteristics. Figure 1 below shows, that there is a major drop in the performance which continues to increase unless regular cleaning is implemented [1].

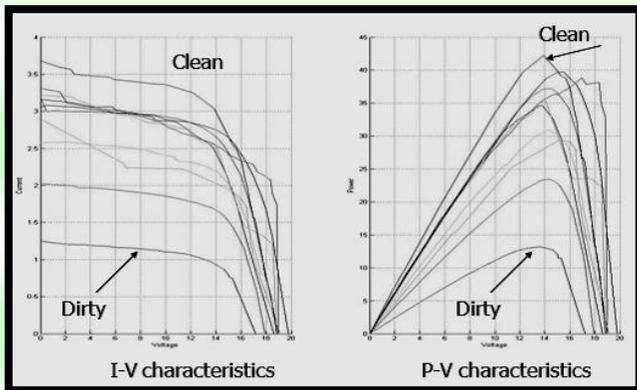


Figure 1

I-V and P-V characteristics of clean and dirty panels [1]

Block Diagram

A simple block diagram of the system is proposed below in Figure 2.

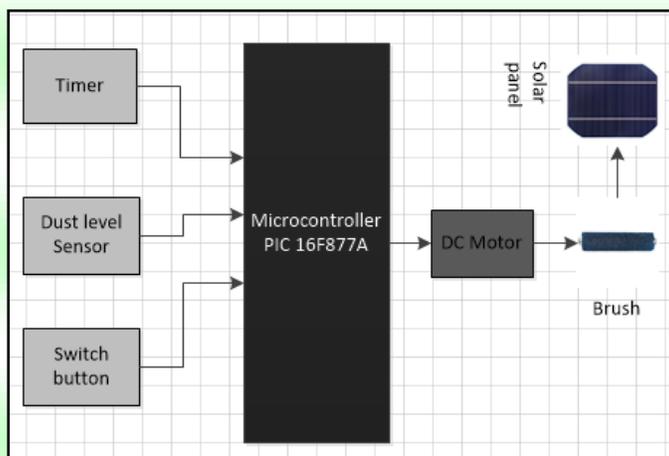


Figure 2 System Block Diagram [1]

System Description

The system proposed is based on three options;

No.1 - The priority option is controlled by PIC microcontroller. Initially, the brush will be placed at the lower end of the panel to prevent shading. After the system is turned on, the timer is set to clean the panel every morning before the sunrise.

No.2 - The dust level sensor option will detect the level of dust on the panel during daytime and transmit a signal to clean the panel, if dust reaches a certain level of thickness.

No.3 - The switch button option is to control the system manually. When either one of these options is activated the PIC will give a command to the motor to work and slide the brush up and down three times in motion to make sure dust is completely removed and the panels are cleaned.

References

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By Ashraf Mansoor Al-Fayadhi, TP018798

Jokes Corner

Year 1

Three Year 1 engineering students were sitting around talking between classes, when one brought up the question of who designed the human body.

One of the students insisted that the human body must have been designed by an electrical engineer because of the perfection of the nerves and synapses.

Another disagreed, and exclaimed that it had to have been a mechanical engineer who designed the human body. The system of levers and pulleys is ingenious.

"No," the third student said, "You're both wrong. The human body was designed by an architect. Who else but an architect would have put a toxic waste line through a recreation area?"

Demanding

Reaching the end of a job interview, the Human Resources Person asked the young Engineer fresh out of MIT, "And what starting salary were you looking for?" The Engineer said, "In the neighborhood of \$75,000 a year, depending on the benefits package." The HR Person said, "Well, what would you say to a package of 5-weeks vacation, 14 paid holidays, full medical and dental, company matching retirement fund to 50% of salary, and a company car leased every 2 years - say, a red Corvette?" The Engineer sat up straight and said, "Wow!!! Are you kidding?" And the HR Person said, "Of course, ...but you started it."

Future car with Fusion power in Shell Eco-marathon Asia 2012

Shell Eco-Marathon is a global annual competition that challenges and encourages Engineering students to design and build energy efficient vehicles with their brilliant ideas and innovations. The competition is split into three events at different districts around the world where the first is held in America, then in Europe and finally in Asia. The winner will belong to the team that can travel the furthest by consuming the least amount of energy possible.

In Asia, All the teams around this zone were gathered at Sepang International Circuit, Kuala Lumpur, Malaysia for the three continuous day event. Our team Xerofusion from Asia Pacific University (APU) was one of them to be involved in Shell Eco-Marathon Asia 2012. The team had participated in the battery category with prototype concept design. Our vehicle is named SparkX and it took a year for planning, designing and building, as per the technical specification, SparkX was officially selected by Shell Asia committee department to compete with other teams from all over the Asia.

First Time Experience

As a first timer in the Shell eco- challenge, we were definitely excited to meet all the Asia participants with their experienced vehicles which had competed in previous competitions and we also observed the innovations that appeared this year. Their unique ideas/design to improve the energy efficient vehicle was great. This year, over two hundred teams were involved, and within the battery categories about 30 teams were registered. On the first day of our shell eco-challenge, we constantly monitored our vehicle as it underwent the final examination to make sure the entire vehicle design met the requirements prior to it going into the inspection stage.



Time for Inspections

The moment that we started pushing our car to the inspection area, it exactly felt like as though we were stepping into the exam hall in APU!! Basically inspection was divided into two independent parts, the safety inspections and the other being the technical inspections. Time after time, the ‘SparkX’ had successfully gone through all the 20 phases of inspections and it was also the number 14 vehicle out of 30 battery category teams that had passed both inspections in one go. After the exhausting examination, the entire team and our car gathered in the garage to prepare for the first run of our Shell Eco-marathon on Sepang international circuit.

Track Running and Final Result

For every vehicle, 5 attempts were given to run the car on the track. The competition organization picks the highest score within these 5 attempts as the final result for the car. In our first attempt, our pilot driver perfectly completed 4 laps within a limited time but it was tragic that the measuring device that was issued by the organizer was not functioning, which resulted in our first attempt being wasted. Fortunately, through conversation with the head of technicians, they had figured out that the fault was not from our team thus the first attempt was cancelled. Finally, five attempts were finished in the second and third day and our results were improved and it increased with each attempt. The highest score reached 136 km/kWh and that allowed us to obtain the 11th position in Asia.

The team Xerofusion, which was formed out of students from various fields of engineering at APU had completed their first Shell Eco- marathon Asia for 2012. “The experiences were just awesome that we couldn’t use any words to describe as a first timers” as also stated by members. Meanwhile, the Shell eco-challenge was not only a competitive event, conversely among of the participants over the Asian countries, it also created a very unique platform to share and learn about the innovations that utilizes the latest technologies and in particular designs for green source powered transportation.

As well as efficiency being important, safety is highly emphasized to the team by the organization to avoid any possible accident such as poor behavior of pilot and so on. Throughout the event, the team had gained an extraordinary vision to futuristic transportation. We had collected lots of new ideas for the fuel cell vehicle and have started preparing for the coming Shell Eco-Marathon Asia challenge in 2013.

By Yong HaoKit, TP022653

Alternative Energy Efficient System for Charging Electric Cars

The main objective of this article is to analyze the design of existing charging systems in electric cars and the incorporation of a newly developed alternative system for charging the batteries. Currently, the major problem faced by electric cars is the limited travel range and the extent of time required in fully charging the batteries. The alternative charging system can be an in-built system of the electric car for charging the batteries at the time of running.

This system can act as a dual system of which the batteries can be charged using an AC power supply source while the car is at rest mode and can be charged by using the power supply reclaimed from the motors fixed on the shaft of the car. The principle of this idea is to use an alternator that is connected to the shaft of the rear wheels. Rotation of the shaft itself generates the electrical energy used for charging the batteries. Battery No.1 is connected to the motors which are installed on front wheels. When the car batteries are fully charged it will facilitate the movement of the car.

Simultaneously, the shaft of the rear wheels rotates, which in turn rotates the shaft of the alternator. The switching circuit comes into play when Battery 1 is connected to the motors and Battery 2 is connected to the charger. As long as Battery 1 is functioning, Battery 2 is charging and before Battery 1 is depleted, Battery 2 should be fully charged. When the system detects that Battery 1 is reaching low levels of charge, the automatic battery switching circuit comes into play resulting in Battery 2 taking over. Simultaneously, Battery 1 begins to be charged by the charger.

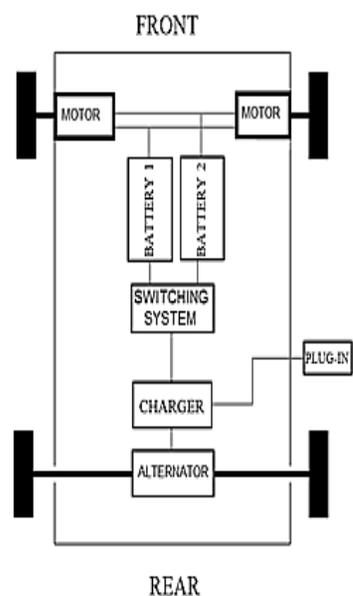


Figure 1 – Model Sketch

As highlighted above, the proposed system is simple, applicable and economically viable. What needs to be noted and taken into consideration is the choice of appropriate components that match the size of the car. For example, if the manufacturer decides to apply this system on a car classified as small in weight and dimension, then the motors, alternator(s) and the batteries must be in relative proportion and sizes.

The system proposed identifies itself as different by having some key features that contributes to the benefits when compared with the existing systems which are used for electric cars. Some of the key features are the simplicity of the concept and design which can attract mass appeal. The key features that can be achieved in the proposed design are by using existing components.

Currently, the negative perception of electric cars is that the travel range is limited. One of the best electric cars in production with a significant travel range is Nissan Leaf. According to its manufacturer, the Leaf can travel for 160km (subject to conditions). Having said that, there are some special cases like the Tesla Roadster with a travel range of 320km, but many experts have claimed that this is not significant enough. Electric cars must be able to travel between cities and longer distances; this would motivate people to use electric cars rather than using internal combustion engine cars.

The alternative system developed in this paper has the capability to achieve these goals. More than half of the components and systems are currently used in electric cars, with only a couple of newer components to be introduced into the existing system of electric cars. By applying the proposed modification in the battery charging system, the number of the consumers for electric cars will increase and this revolution could prove to be a major challenge for internal combustion engine cars. Furthermore, by incorporating this idea into the production line, many changes can be realized such as reduction in air pollution, global warming, reduction in fossil fuel usage and its price. Currently electric cars need a charging station on the highways and streets. In fact, there is a plan to make 4.1 million electric vehicle charging points in North America by 2017. There is reason to spend such huge sums of money, energy and material when we can make an electric car that can charge by itself.

Tesla Roadster is one of the best electric cars in the market that takes four hours to charge maximum level of the battery from the empty level. For Nissan Leaf, the new and increasingly popular electric car, by using 3.3 kW charger, it takes eight hours to charge fully from a depleted battery. As it is clear the electric cars user must spend significant time to have a fully charged battery and apart from the reduction in fuel cost, pollution and global warming the most important benefit of using Alternators (with proper configuration) is to prevent wastage of time by the user to charge the battery. The concept of using alternator in battery charging system of electric cars can solve two problems; 1) travel range and 2) charging time. With the proper program for controlling the charging time and the availability of switching the batteries at the proper timing, the electric car is capable of travelling hundreds of kilometers without spending even one minute of charge from the batteries, because the car is self-charging to charge its batteries.

The Importance of Attending Class

Class attendance facilitates learning in a variety of ways. Lectures supplement reading assignments. Classroom presentations present information differently than the text. Discussion and elaboration of topics provide current information that may not be found in the textbook. Hearing comments and questions of others can answer your questions. Lecturers can use class discussion to enhance critical thinking skills. They can pose questions that require students to make connections between concepts and relate what they are learning to real life. The more students analyze and examine material, the better their retention will be. Attending is much more beneficial than it is perceived to be. Students should not be confident of the non-importance of attending classes.



Most people who fail a course usually did not attend classes regularly. Regular class attendance requires discipline and time management skills. These skills are beneficial no matter what career path you choose or where you work in the future. Attending class also increases a student's interaction with a variety of School of Engineering academic staff. This raises the likelihood of finding mentors and role models who can help guide their academic, career and personal development.

Students miss class for a variety of reasons. Some of the most frequent reasons are because they need to complete other course work, find the class boring, are ill, or have social obligations. Some lecturers are very textbook-oriented. You will run into some who read the text rather than provide extraneous information in their lecture. You may think this is a waste of your time to attend class. It is not. While your instructor is reciting the text, you are hopefully absorbing the information and in turn, decreasing your study time later on.



If you pay attention in class, you may be surprised by how much you can cut your study time later on. No textbook can explain something to you like another person can.

Some lecturers are not textbook-oriented at all. They lecture their own material and the textbook is used for clarification of concepts. In a class like this, test questions will more than likely be based on lecture notes, not the text. Good notes are what will save you. You won't have good notes if you don't attend class.

Regardless of what kind of lecturer you have, keep in mind that lectures are a continuation. One follows the other – If you miss one and don't get the notes, you will be missing chunks of information. Since most information is cumulative, this can lead to you not grasping entire concepts.

Students who attend class on a regular basis do better in class. Engaged students do not just fill a seat. They participate in class discussions and ask appropriate questions. Skipping class can be a fast track to poor performance, increased stress and anxiety, lower CGPAs, dropping classes, and even eventually dropping out of the university. Realize that going to class is not a decision that needs to be made. It is mandatory so please GO FOR CLASS, thank you.

By Dr. Vinesh Thiruchelvam

Automatic Meter Reading & Billing via GSM Network

Introduction

In the last few years the use of traditional electricity meters resulted in wastage of time and money for the service providers. In order to solve the problems faced by the service providers, the Automatic Meter Reading and Billing via GSM Network project was developed. The system consisted of a GSM and additional circuitry including the PIC. The PIC controlled the whole system while the GSM was responsible for the receiving and sending SMS.

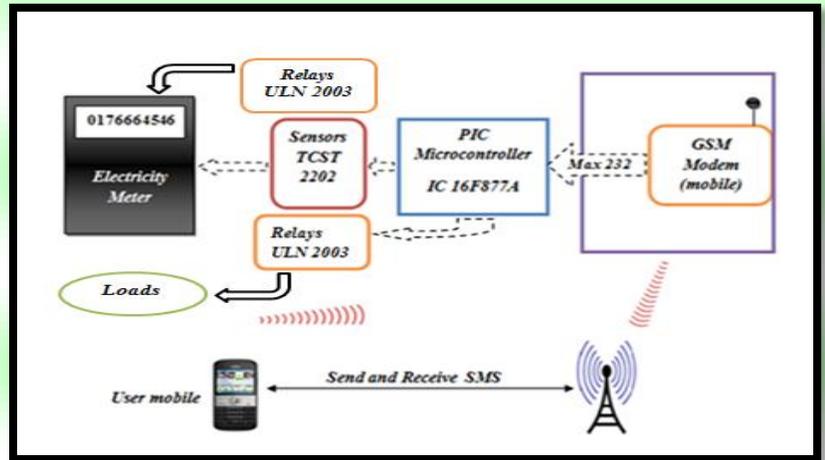


Figure 1 Scheme Design by Amr Mohammed

Working Principle

Once the electricity meter receives the PIN number of the reloading card of the electricity, it enables the electricity usage at the house or apartment. The meter will start detecting the units that have been reloaded according to the electricity consumption. Moreover, when the units reach to the last ten units the meter directly sends a warning message via SMS to the user to inform him/her about the meter status and how many units left over, then it keeps on working until it reaches to the last five units then it sends another warning message and it keeps on working as well until it reaches to the last unit then it sends to the user the final warning message telling the user that your units are finished and please top up again. Meanwhile the last unit is still consuming if the user does not reload his/her meter the electricity will be disconnected and the meter will be in standby mood until the user top's up the meter again or else no electricity service will be provided.

By Amr Mohammed Abdulaziz, TP018134

SoE Collaborations

On the 28th of November 2012, the research collaboration agreement on 'gas hydrate' was signed off at Universiti Teknologi Petronas, Curtin Malaysia Sarawak and Asia Pacific University. SoE's Dr Firas Ismail and Dr Vinesh Thiruchelvam participated in the signing along with Dr Khalik Sabil, UTP and Dr Amar Sahed, CSM.

On the 28th of December 2012, the MOA between APU SoE and UCES Sdn Bhd on academic support for telecommunication projects and student internship was signed off.

A Glimpse of Internship @ SoE

Engineering students finishing their 3rd year of study will need to undergo a compulsory 12-weeks continuous period of placement with companies relevant to their programmes of studies. The industrial placement programme is in accordance with the requirement of the Board of Engineers Malaysia (BEM). By going through short attachments with companies, students will be able to experience the process of job application, real working environments, and improve on their technical and soft-skills tremendously. In addition, students can take the opportunity to secure employment with their placement companies as well as cultivating ideas for their upcoming final-year project. Typically the School of Engineering will have students going for their industrial placement starting in February, April, July, September and November respectively. Any enquiries on industrial placement should be directed to Internship Placement Officer, Dr Thang Ka Fei (ka.fe@apu.edu.my) or on Ext: 5172.

By Dr. Thang Ka Fei

SOE STUDENT LIFE

All Work No Play

The School of Engineering at APU is one of the fastest growing schools and is gaining recognition both locally and internationally. This is because all the four engineering programmes offered by the School are current in terms of technology and are market driven, and thus have great employment opportunities. The vision of the School is to be a leading provider of Engineering and Technology based education with innovative approaches to enhancing lifelong career opportunities worldwide.

As well as succeeding academically, the school of engineering ensures you enjoy your time as a student. This is encouraged by the different engineering events, activities, societies and clubs just to name a few which provide a variety of educational trips, conferences and seminars. These are emphasized by the university's mission to provide high quality, innovative teaching, learning and maintains professionalism for all its programmes.

Student life experience differs among the students and change over time from a first-year engineering student to a graduate through academic involvement, satisfaction, and achievement. The school of engineering undertakes to provide an education that consists of experiences both in and outside of the classroom based on a theoretical, experimental and ethical foundation enhanced by opportunities for participation in research, internships and interdisciplinary programmes and to educate students for professional leadership, civic influence and lifelong learning.



Visit to MAS & Shell Eco-Marathon



Level 4 Engineering Class, 2012-13

The School of Engineering is a diverse faculty with a large number of international students creating a rich cultural feel. Many students come from overseas to study world-renowned engineering, science disciplines and gain an international education that is valued in their home country. This benefit works both ways and home students gain so much from the different cultures overseas students have to offer; something employers really appreciate.

No course is perfect. At APU academic staff take feedback seriously and are always looking to improve the faculty with influence of technology advancement for a better and suitable environment. At the end of every semester each student gets to fill in an evaluation-form from every degree programme to deliver constructive feedback to lecturers who act as a bridge, reporting back to students on outcomes. Students also have access to online feedback which is available all year through.



Students Informal Discussion @ Cafeteria



Multi-Cultural Night 2012

As an engineering student, it is not only about your academics but gaining valuable skills in teamwork, leadership, communication, negotiation and having opportunities to serve on focus groups and other higher committees in the University. As well as gaining a degree that is well respected by employers around the world, you will find APU school of engineering an exceptionally rewarding environment to study, gain, share ideas and experiences throughout the exciting journey towards becoming an ethical and professional engineer.

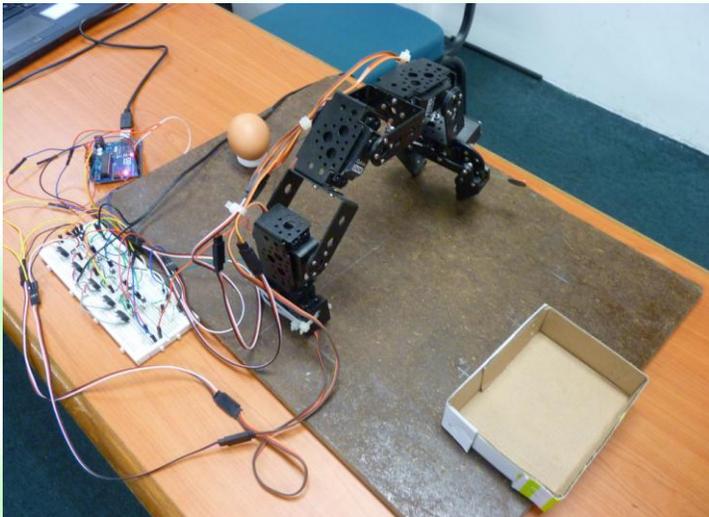
**FINAL YEAR SOE STUDENT PROJECTS
DECEMBER 2012**



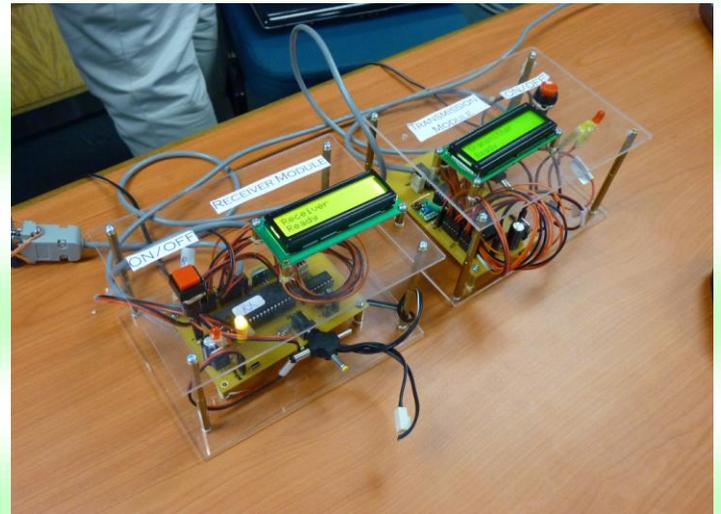
Automatic Meter Reading and Billing Via GSM Network
Amr Mohammed Abdualaziz, TP03418



Home Energy Management System
Akram Mohammed Ali Al Akwaa, TP017505



Egg Sorting Robot Arm
Nicky Johan, TP017026



Protected Wireless Distribution System
Abdrahaman Yassin Awad Ismail, TP019260



Enhanced Ray Concentrator for Dynamic Photovoltaic Power Generation
Noel Robert Banzi, TP015394



Electricity Generation from Waste Water using Microbial Fuel Cells for Various Electrical Applications
Gurushen Singh A/L Gurucharan Singh, TP017639

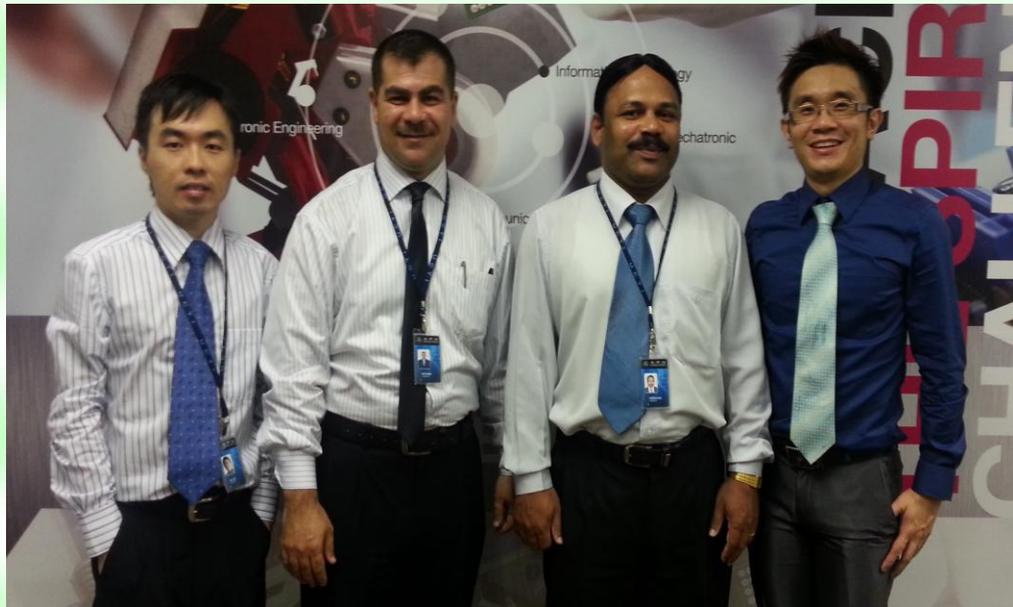
SOE PHOTO GALLERY



**SoE @ Education Fair, PWTC
Dec 2012**

SoE New Staff

From left,
Dr Lim Wee Han (Electronics)
Dr Raed Abdullah (Telecommunications)
Mr Veeraiyah Thangasamy (Telecommunications)
Mr Pang Jia Yew (Electrical)



GO GREEN, SAVE THE PLANET PLEASE!

If you would like to be a part of the 'Engineers Insight' editorial team or have an article/paper published please contact shankar@apu.edu.my