

Teaching & Learning Activities to Promote Professional and Team-Work Skills

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ATAN KITA

Why is this important?

- As a collective unit, workers / lecturers are more efficient and productive than if they were to work as individuals
- Important to prepare students for good theory and experience
- Prepare university and student for fierce competition

Case studies

- Perodua Eco Challenge – Team works between Faculty of Economy and Management and Faculty of Engineering and Built Environment
- Robocon – Building Professional Teams
- Course Delivery: Recent Topics in Mechanical Engineering
- Course Delivery: Final Year Design Project / IDP / Capstone

How do you promote teamwork in the classroom?

Here are some tips:

1. Call them teams, not groups. A group consists of people who coordinate their individual efforts. ...
2. Nurture team relationships from the start.
3. Provide opportunities for teams to reflect on their dynamics and decide on ways to improve. ...

- Professional Development (PD) is quite simply a means of supporting people in the workplace to understand more about the environment in which they work, the job they do and how to do it better. It is an ongoing process throughout our working lives.
- There is no PO on professional

Sample: CO - CPS / CEA Mapping

Programme Outcome (PO) relationship with Complex Problem Solving (CPS) and Complex Engineering Activities (CEA)

Codes	Courses	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
KKKM2012	Integrated Project I			CP3 CP4 CP5						CEA2 CEA4			
KKKM3012	Integrated Project II			CP3 CP4 CP5	CP3 CP4 CP5			CP3 CP4 CP5					
KKKM3223	Fluid Dynamics				CP3 CP4 CP5								
KKKM4953	Engineering Design and Manufacturing I	CP1 CP2 CP3		CP1 CP2 CP3		CP3 CP4 CP5							
KKKM4963	Engineering Design and Manufacturing II		CP1 CP2 CP3	CP1 CP2 CP3	CP3 CP4 CP5					CEA2 CEA4			
KKKM4064	Research Project II		CP1 CP2 CP3	CP1 CP2 CP3	CP3 CP4 CP5					CEA2 CEA4			

Case Study 1 - Perodua Eco Challenge



MYCOBOX
Redefine Space.

Car Seat Storage Compartment



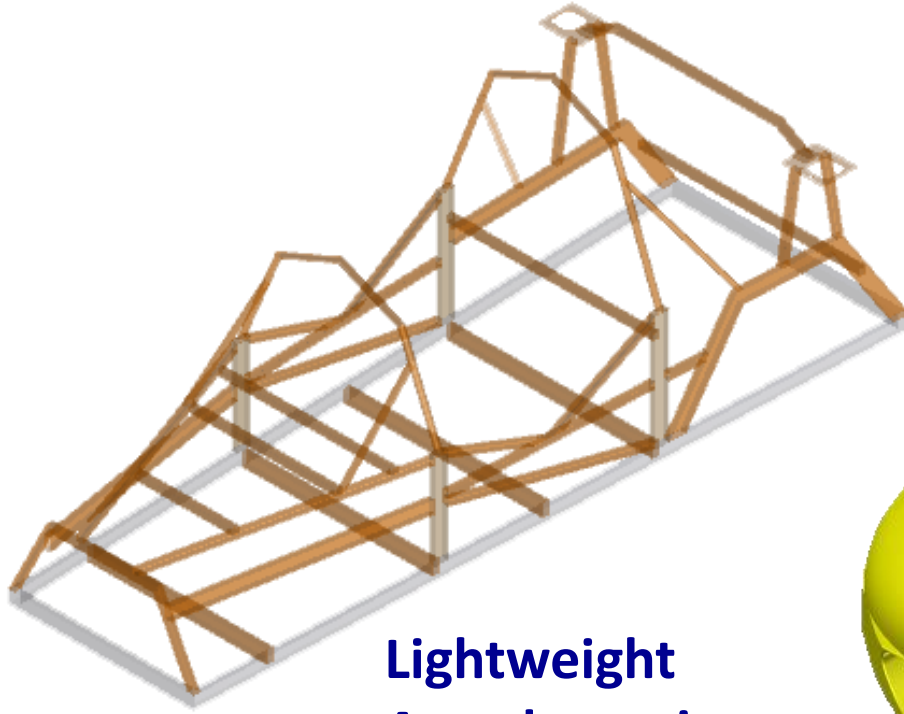
- TOP 10 FINALIST FOR PERODUA ECO CHALLENGE



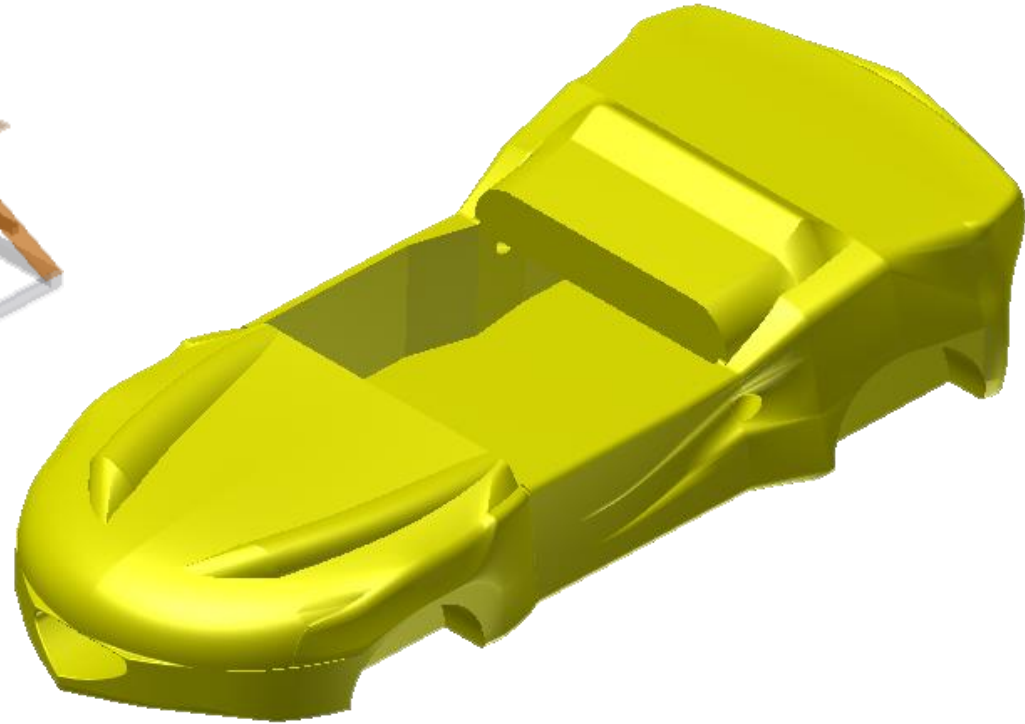
Discussions with the team's advisor from Perodua

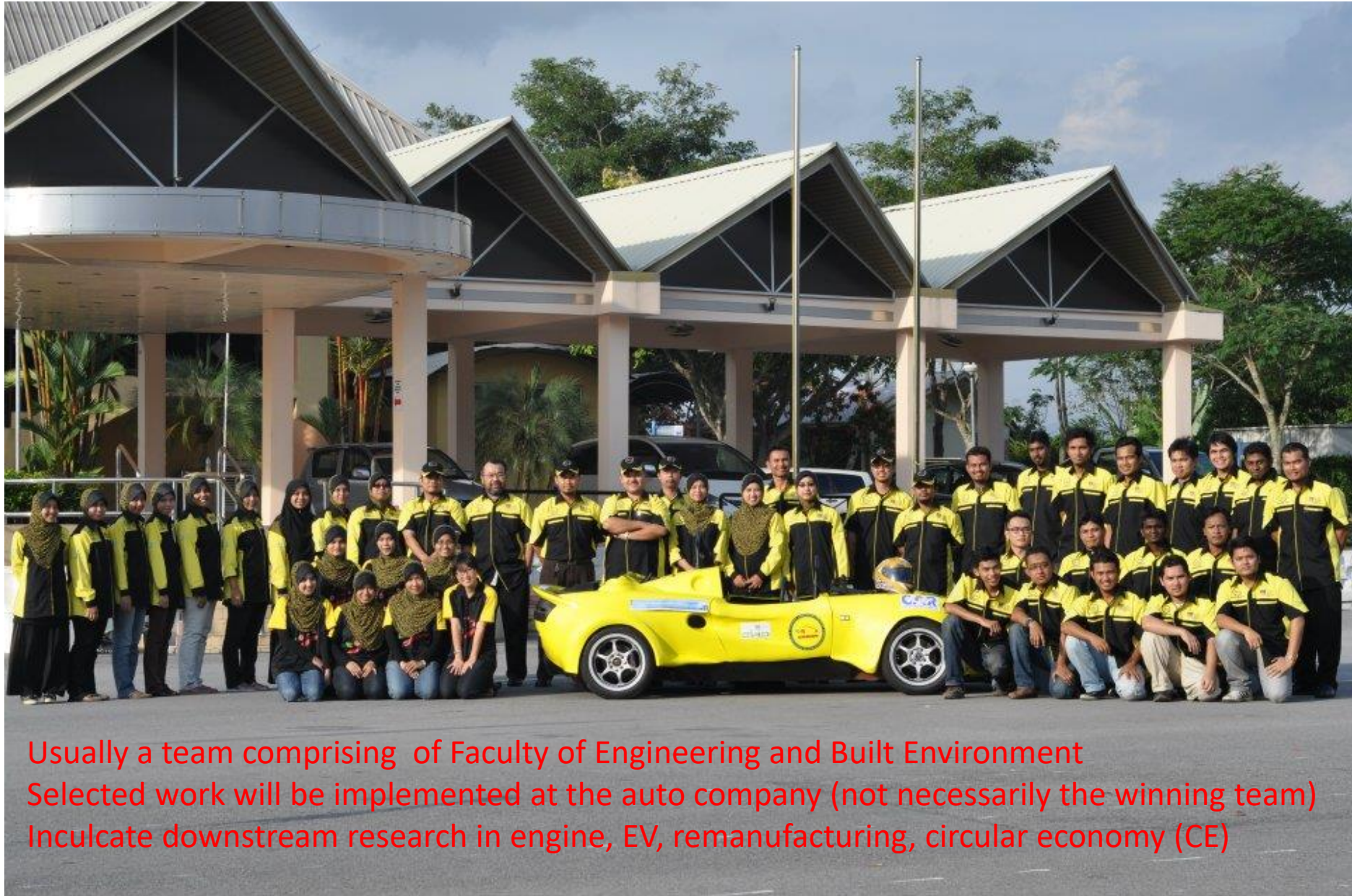


Design Concept (Project much earlier)



Lightweight
Aerodynamic
More stable
Good weight distribution
Wider front vision





Usually a team comprising of Faculty of Engineering and Built Environment
Selected work will be implemented at the auto company (not necessarily the winning team)
Inculcate downstream research in engine, EV, remanufacturing, circular economy (CE)

Downstream activities

- Policy on Remanufacturing Industry
- Close engagement with the public, authorities (Road trspt department, DoE, City Councils)
- Enhancing Circular Economy (CE)
- Policy on end-of-life vehicle (ELV)
- Drawings and experience used by fellow lecturers for application as professional engineer



Meeting with MARii (automotive agency), MAARA (automotive Manufacturers Assoc., government and academics to modernize scrapping of vehicles) and supplier Kolbelco, Sep 2022.

Case Study 2 - Robocon Competition (National Level)

Introduction of Robocon

Robocon is an annual national level event organized by KPT. This competition aims to improve the knowledge of robotics technology among students of Higher Education Institutions while also giving space to students to showcase their skills, innovation and creativity in the field of creating robots. In addition, this activity fosters the spirit of student cooperation in teams to complete the projects.



The winner of this competition will represent Malaysia for participation in the International Level

Robocon 2022 Competition

- For Year 2022, **USM, Penang** has hosted the competition with the support of KPT and also RTM. The winner of this competition will represent Malaysia for participation in the International Level which will be held in India.

The theme for Robocon Malaysia was decided as Lagori-Tuju Tin to relate to the Malaysian Game and infuse the Malaysian flavour for the competition. The game is between two teams (Team 1: “Seeker” and Team 2: “Hitter”) and the game starts by throwing a ball by the seeker to break a stone tower called “Lagori” (figure below). While the seekers try to pile up the stones again, the hitter throws balls to interrupt them. The game of Tuju Tin or Baling Tin was commemorated in year 2000’s Pos Malaysia Stamp as Malaysian children traditional game is shown in figure below.



Robocon 2022 Team Development

The construction of robots requires expertise from the fields of mechanical and electrical/electronics engineering. Therefore, in order to train the spirit of student cooperation between departments, team members are formed from the combination of these two departments.

(Dept of Mech-Dept of Elec with 20 members)

Mechanical

Dr. Wan Aizon

Dr. Meor Iqramlr Dr Rizauddin Ramli

Dr. Kamaliana

Dr. Nashrah

Mr. Zulkhairi

Electrical

Dr. Anuar Mikdad

Dr. Hairi

Dr. Hafiz

Dr. Asyraf

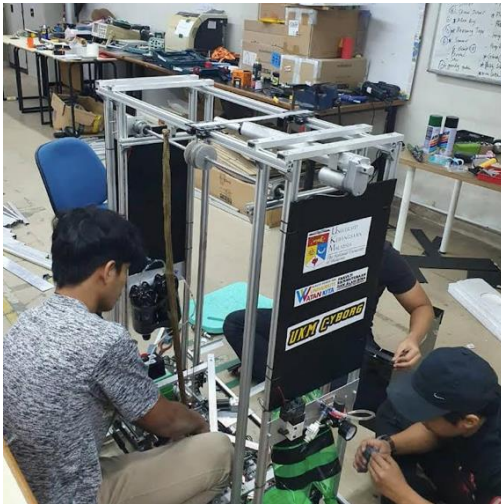
Dr. Seri

Dr. Amirul



Design of Robot

In order to fulfill the theme of the competition this time, it is necessary to build two robots. Robot 1 is for shooting and robot 2 is for sorting lagori. Students split into two teams to ensure the robot can be completed on scheduled.



Robot 1 construction process



Robot 2 construction process



Coding process



Robot parts cutting process

Collaboration and teamworks

- To ensure that the robot can be completed, collaboration works according to their respective expertise has been carried out between mechanical engineering and electrical/electronic engineering students.
- Mechanical student were focused on design and mechanism works while electrical/electronics students focused on electronic circuit and coding works.
- Progress/performance monitoring is done with the advisory lecturers from both departments



Discussion between students and lecturers



Progress monitoring from advisor

Robocon Achievement

2019

This team combination has managed to create two robots in a short time and managed to win 2nd place in the robot race event.

2022

The team won the group and qualified for the quarter finals. Is the best 8 teams out of 24 teams



To quarter final



Top 8 best teams



Medal for Top 8 best teams

Ongoing works between Mechanical and electrical Department –
One of the nation biggest challenge – labor crunch

DYNAMIC SELF-LEVELLING AND HIGHLY MANEUVERABLE SKYLIFT FOR HARVESTING

Ir. Dr. Zambri Harun



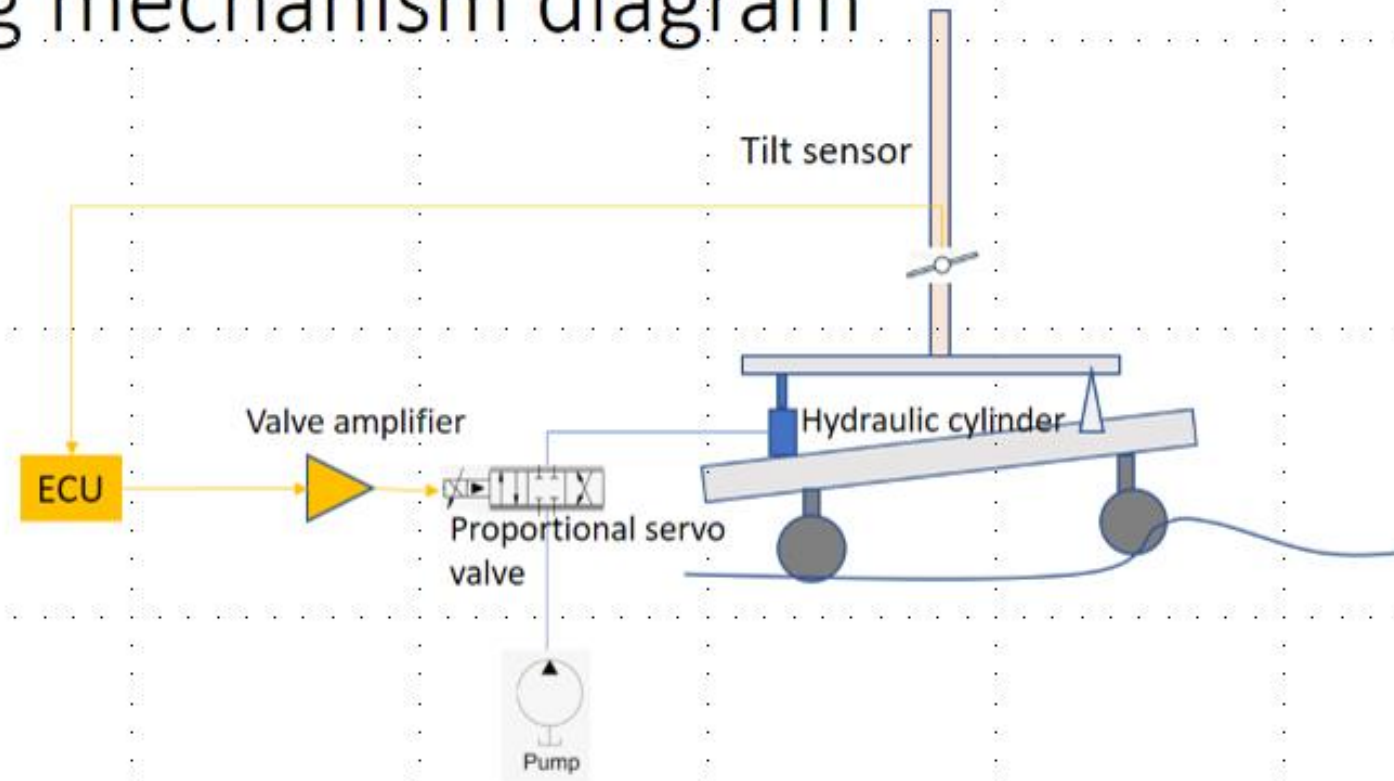
University Duisburg-Essen,
Germany



MPOB Mechanisation and Automation Unit

A slide in the grant joint submission.
Hydraulic system, ECU, Recognition system, Ergonomic

Tilting mechanism diagram



The actuator will automatically adjust the pitch and roll angles of the platform according to the terrain to ensure the platform remains levelled when moving on uneven ground. The feedback schematic for the self-levelling platform

Case Study 3 – Recent trends in Mechanical Engineering

- Sharing with students latest technology
- Collaboration with Petronas and KTMB
- Teamwork among lecturers – what are the skills you have developed?
- Technology-rich active learning – Richard Felder
- Every semester the teaching team will plan series of talk
- It is intended that the theme suitable with the course – the topics must be recent and the speaker is prominent in the related fields.
- Practically, the meaning of “recent” is related to pillars in Industrial Revolution 4.0 and world Sustainable Development Goals.

Recent Topics in Mechanical Engineering

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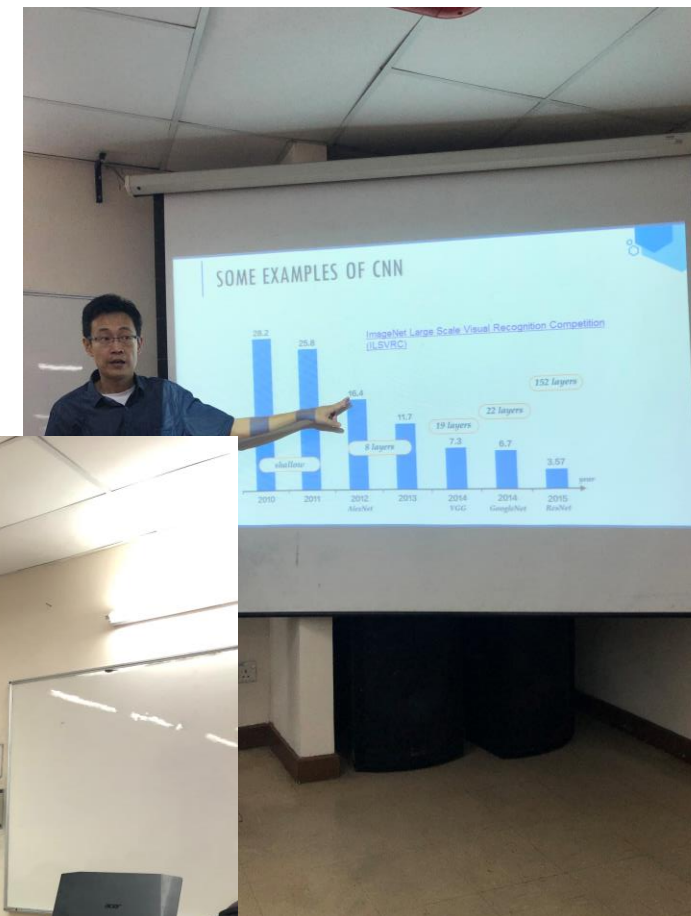
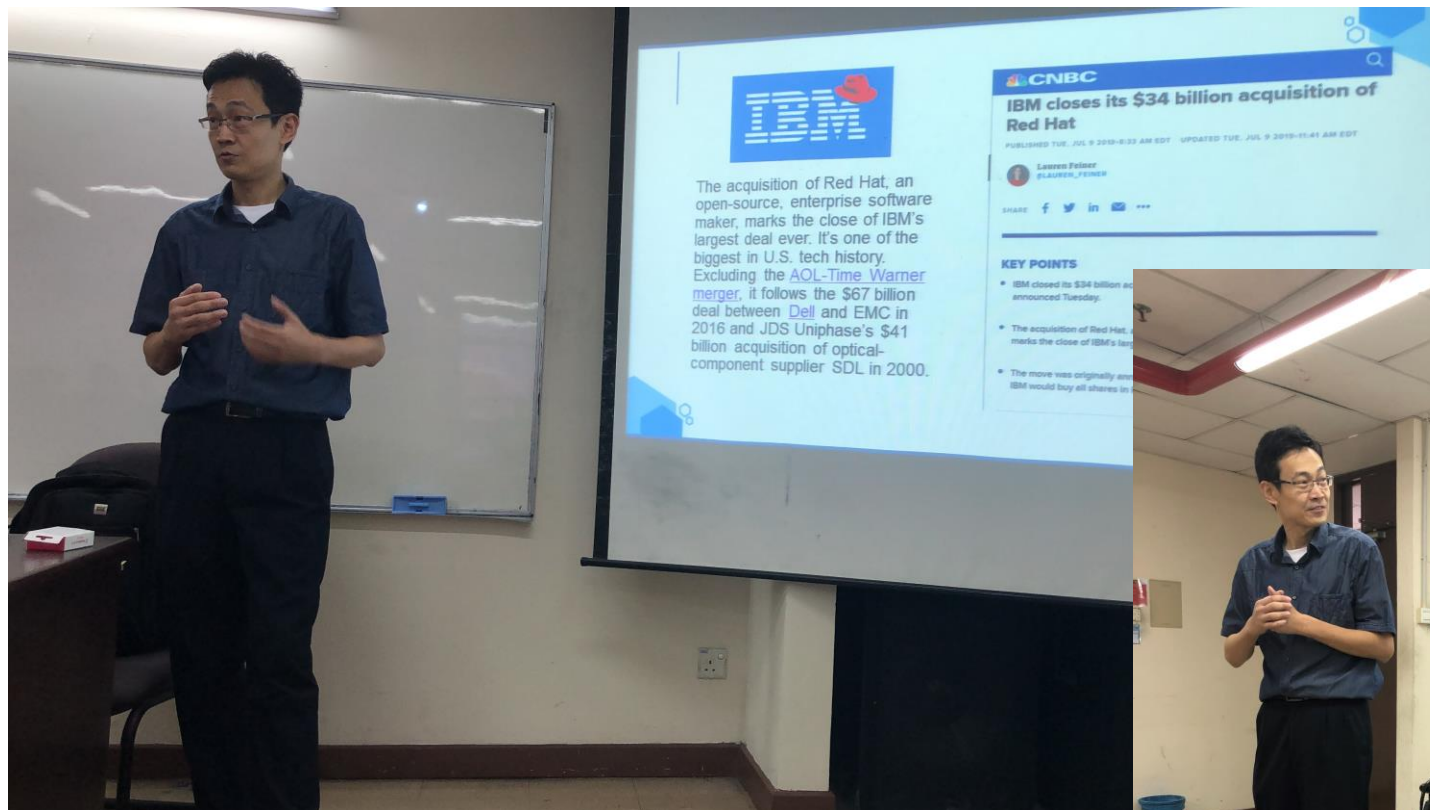
Recent Topics in Mechanical Engineering

- Some talks that had been conducted are as listed below:
 - **The needs of IoT in dynamics and finite element modelling** by Mr. Mustafa Bayansar, DAG Technologies (M) Sdn. Bhd
 - **Essentials of professionalism & good practices in engineering** by First Admiral Dato' Ir Hj Ahmad Murad Bin Hj Omar, (Retired) Royal Malaysian Navy (RMN)
 - **Augmented Reality** by Dr Helmy Abd Wahab, UTHM
 - **Essential of open source & cloud computing in Engineering** by Tan Chin Luh, Machine Learning Engineer
 - **The needs for innovation in an engineering practices** by Dr. Choong Chee Guan, Politeknik Tunku Syed Sirajuddin

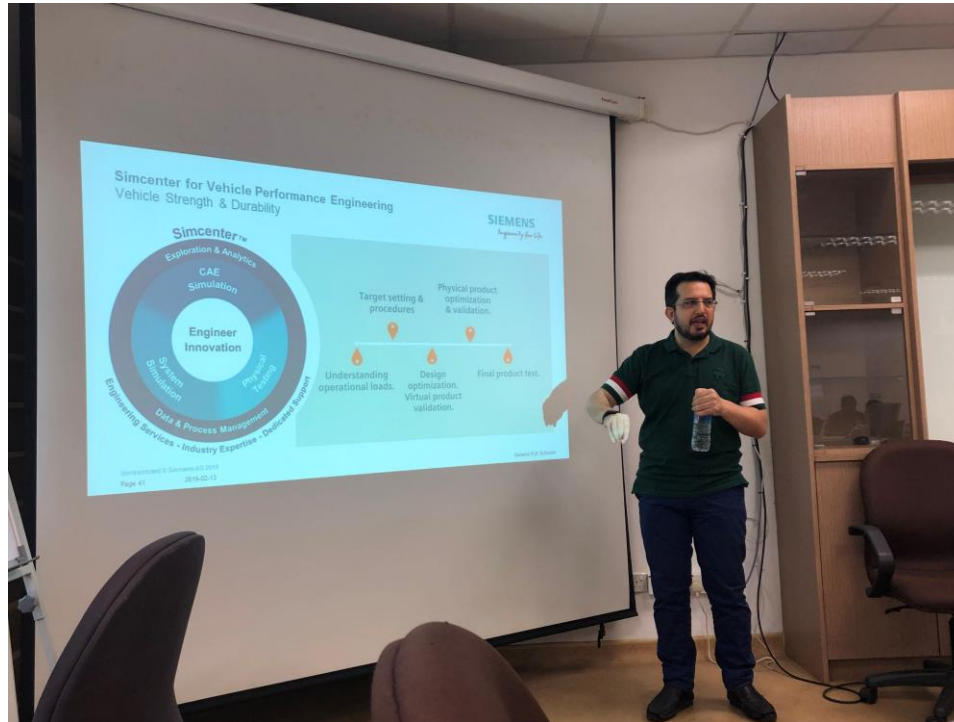
Recent Topics in Mechanical Engineering

- Some talks that had been conducted are as listed below:
 - **Cyber Security** by Dr. Sarah Khadijah Taylor, Digital Forensic Dept. Cyber Security Malaysia
 - **Engine Performance and Efficiency enhancement** by Ir Azmi Osman, PROTON Learning & Development
 - **IR4.0 : Expectations & Challenges in Evaluating Disruptive Inspection Technology** by Ir Hambali Chik, Group Technical Solutions PETRONAS
 - **Recent Practices in Manufacturing Industry** by Mohd Zarif Zainal, HOD of Mechanical Department, SONY EMCS
 - **Antara Realiti dan Fantasi Alam Siber (*Between Reality and Cyber Fantasy*)** by Assoc. Prof. Dr. Masnizah Mohd, Head of Cyber Intelligence Lab, FTSM UKM





Open-sources software like scilab, openFOAM, latex



SIEMENS – Technology, communication



SIRI CERAMAH INDUSTRI
Topik Terkini Kejuruteraan Mekanikal

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The National University
of Malaysia



 **Penceramah**
IR. HAMBALI CHIK
Group Technical Authority (GTA)
Head, Materials Corrosion & Inspection (MCI)
PETRONAS

 **Moderator**
PROF. IR. DR SHAHRUM ABDULLAH

Warga JKMP
Dijemput
HADIR



Topik :
"Considerations in
Inspection & NDT Technology
Selection in Oil & Gas Industry
and What to Look Out For"



<https://tinyurl.com/TopikT5> | ISNIN | 17 JAN 2022 | 4 - 6 PM

*Anda
dijemput
hadir*





<http://bit.ly/KKKM4352-2>

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KKKM4352
TOPIK TERKINI
KEJURUTERAAN
MEKANIKAL

"IR4.0- Expectations
& Challenges in
Evaluating
Disruptive Inspection
Technology"

Ir. Hambali Chik

- Group Technical Authority (GTA)
- Head, Materials Corrosion & Inspection (MCI)

02 NOVEMBER 2020
ISNIN, 4.00-5.30 PM
ATAS TALIAN - MS TEAMS

PETRONAS is a fortune 500 company,
rises to 216 on June 2022.

Oil and Gas company, upstream,
downstream businesses

Ir Hambali sits as an industry adviser
for the Department

SIRI CERAMAH INDUSTRI
Topik Terkini Kejuruteraan Mekanikal



Penceramah

PROF. MADYA DR. MASNIZAH BINTI MOHD

Head of the Cyber Intelligence Lab
Center for Cyber Security (Cyber)
UKM



Moderator

PN. ZALIHA WAHID

Warga JKMP
Dijemput
HADIR



Topik :

**"Current Cyber
Threats in Malaysia
and Best Practices**

<https://tinyurl.com/TopikT4>

ISNIN

10 JAN 2022

4 - 6 PM

SIRI CERAMAH INDUSTRI
Topik Terkini Kejuruteraan Mekanikal



Penceramah

EN. MOHD ZARIF B ZAINAL

Head of Mechanical Engineering Department,
Production Engineering 1 Division,
SONY EMCS (M) SDN. BHD.



Moderator

PN. ZALIHA WAHID

Warga JKMP
Dijemput
HADIR



Topik :

**"Status Semasa
dan Hala Tuju Industri
Pembuatan (Elektronik)"**

Direction of Manufacturing Industry in Malaysia

<http://bit.ly/KKKM43552-1>

ISNIN

15 NOV 2021

4 - 6 PM

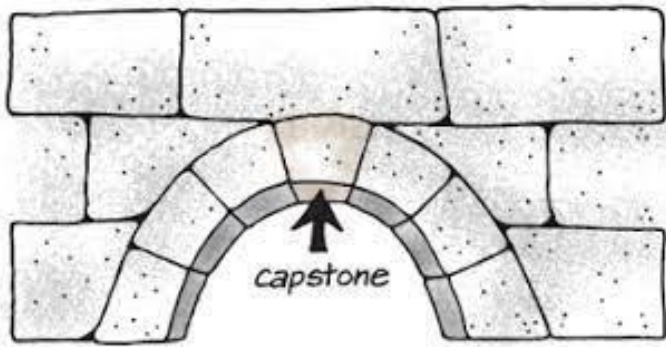
Recent Topics in Mechanical Engineering

- Collaboration with Petronas
 - Every session, the team tried to get Y.Bhg. Ir. Hambali Chik, Group Technical Solutions PETRONAS to give talk.
 - As one of the Industrial Advisory Panel, the speaker is aware that exposure to the real problem and recent issue to the final year student is very important.

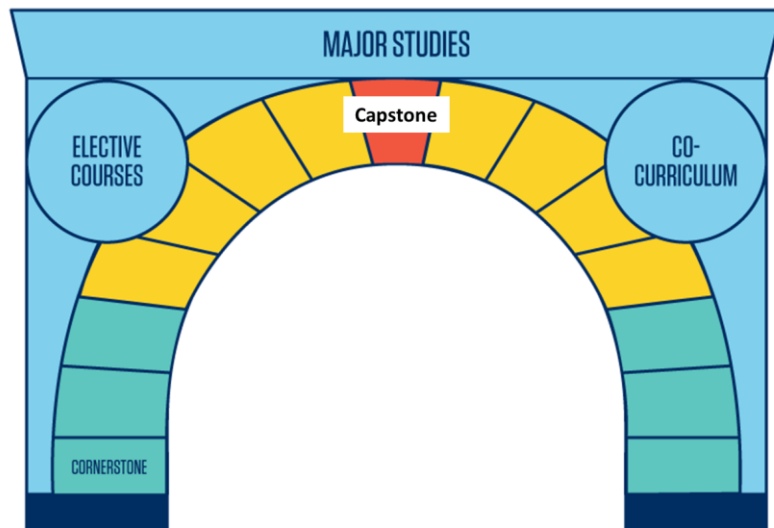
Recent Topics in Mechanical Engineering

- Teamwork among lecturers – what skills we developed?
 - By coordinating the course, we have learned that networking is very important especially to get to know and contact the key person in our field of research interest
 - Petronas accepts **internship**, I have to go to Pengerang next week.
 - Student will bring back **FYP** from Petronas
 - **Grant** submission by AP Ir. Dr. Rizauddin (Drone monitoring)
 - Communication and personal relationship skills

Case Study 4 – Course Delivery of Final Year Design Project



- As a capstone course, it serves as the **culminating** and **integrative experience** of an educational program
- The purpose of this course is to impart knowledge and ability to conduct analysis and synthesis in the implementation of a **product development project**.
- Design process and methods, definition of design objectives, conceptual design, detail design, design evaluation, risk and reliability, design optimisation, product durability and reliability, product manufacturability, factory set up, material and equipment acquisition, facilities planning, product marketing, profit and loss, risks in product development, quality management, manufacturing process, production planning, health and safety and sustainable development must be incorporated and highlighted in the design project
- In this course, students will acquire the experience of **working in a team**. The course will be completed with the development of a **prototype**, a series of **project presentations** and submission of a detailed report on the proposed product design and development.



■ Foundations Courses ■ Explorations Courses ■ Capstone Course

Final Year Design Project

Composition of group members

- Each group equally assigned, in terms of CGPA, male/female, race
- To ensure that students learn not only technical skills, but also soft skills, for example, how to get along and work with other students that they are less close with.

Choice of product

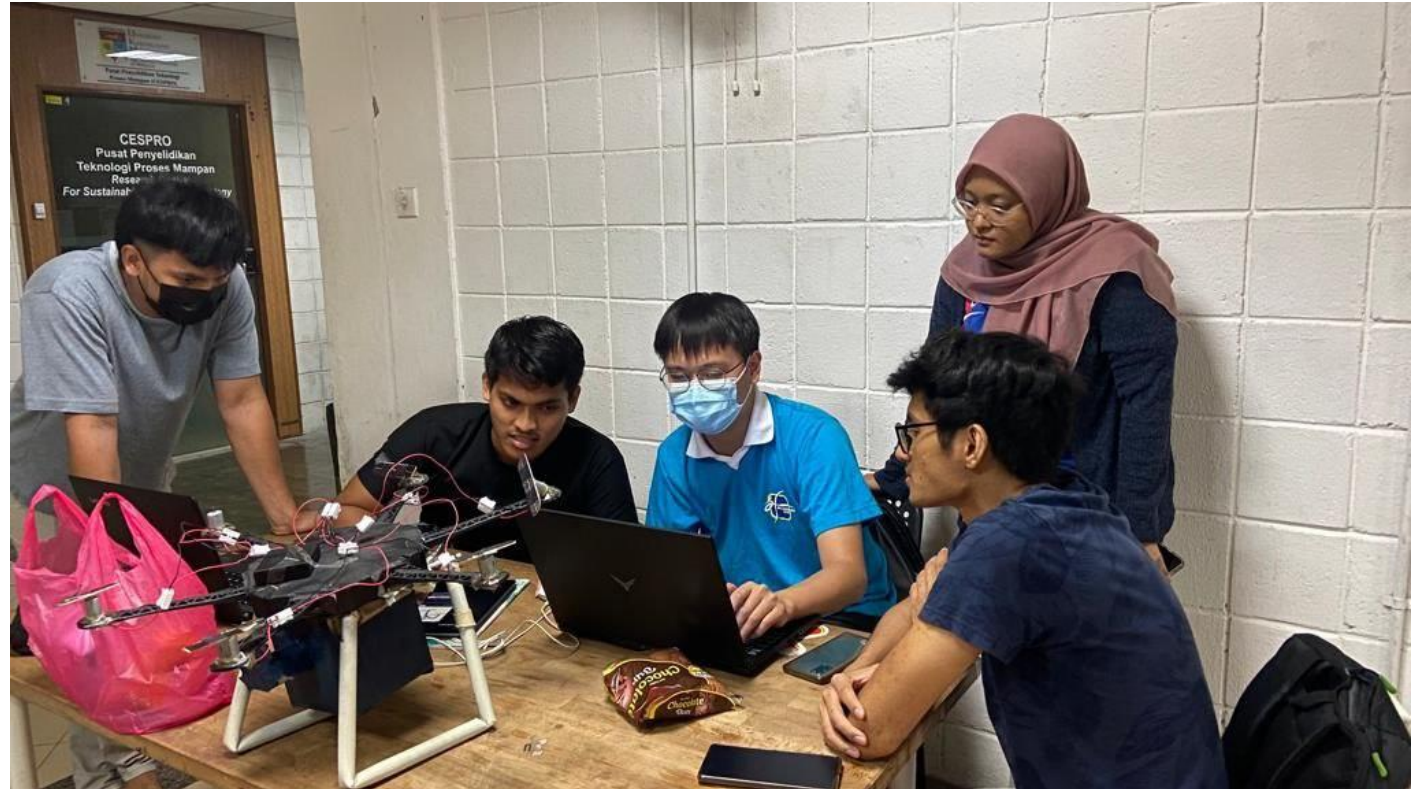
- Students are assigned project criteria and themes.
- So explore and propose their own ideas
- Conceptualisation of design based on customer requirements: Survey, Needs Analysis

Team-work activities

Group discussion



Making the prototype



Group Presentation



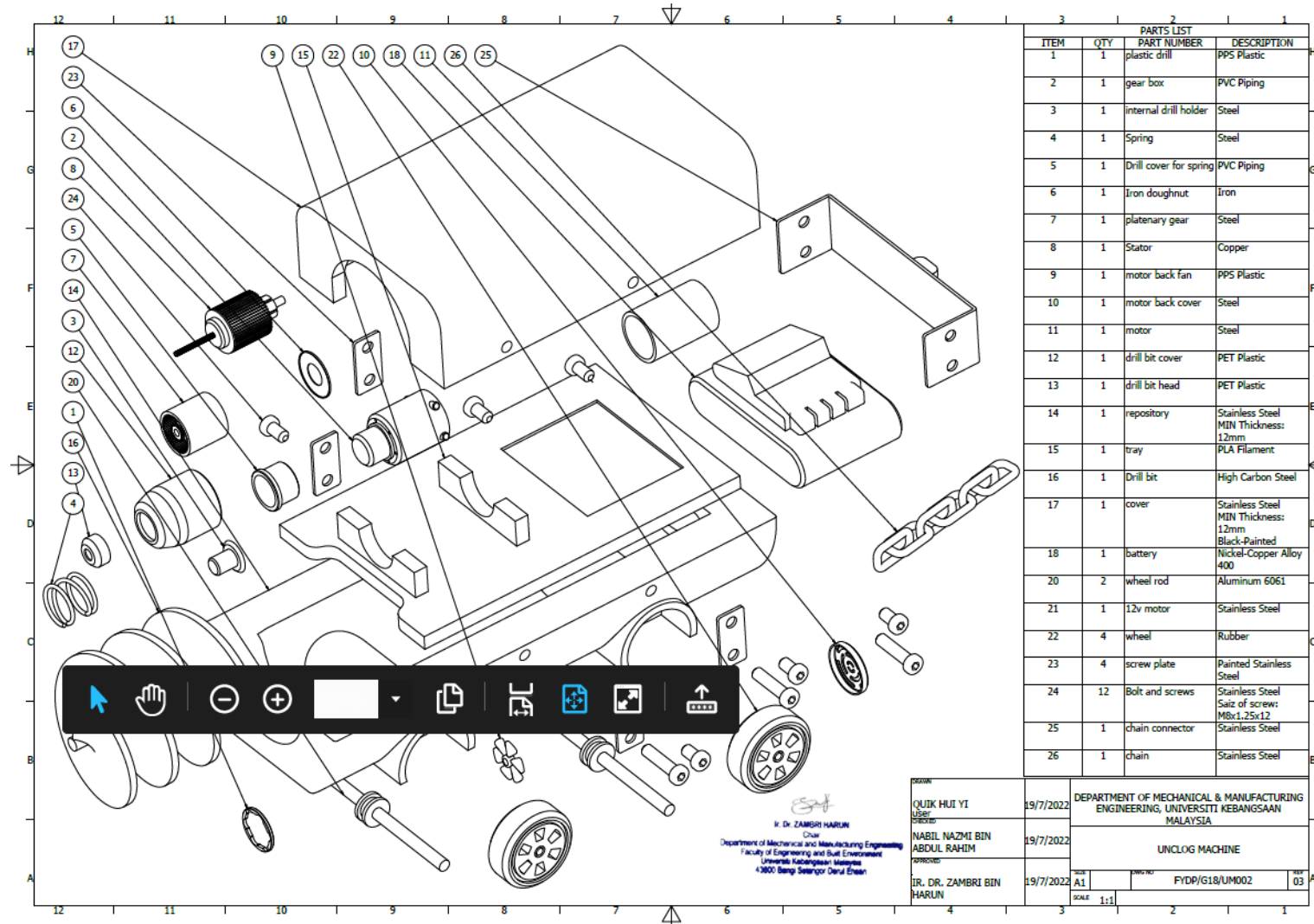
Prototypes



Mechanical Engineering Design & Manufacturing Colloquium (MDMC 2022)



Typical drawing – Exactly the expectation in the professional world



Mechanical Engineering Design & Manufacturing Colloquium (MDMC 2022)



Opening Speech by the
Department Chair



Speech by engineers
from the Industry

Invited examiners from
the industry and alumni:

- Proton
- KTMB
- Delloyd
- Sapura

Mechanical Engineering Design & Manufacturing Colloquium (MDMC 2022)



Proceedings Publication



Awards to Top 5 Best Prototypes

FYDP Website: <https://sites.google.com/ukm.edu.my/fydp-mech-eng-ukm/home>

Recognition at the National level



TAHNIAH

Congratulations



**MUHAMMAD IZZAT FARHAN
&
NURUL HANNANI ABDUL HADI**
JABATAN KEJURUTERAAN MEKANIKAL & PEMBUATAN
Dept of Mechanical and Manufacturing Eng
kerana memenangi

TEMPAT KETIGA
Third place
Integrated Design Project Short Video
Competition 2022



Penganjur
The Institution of Engineers, Malaysia (IEM)
pada
30 Ogos 2022

FAKULTI KEJURUTERAAN DAN ALAM BINA  ukm.my/jurutera   fkaofficial



INTEGRATED DESIGN PROJECT SHORT VIDEO COMPETITION 2022

CONGRATULATIONS TO ALL WINNERS



<u>MECHANICAL CATEGORY</u>	<u>ELECTRICAL CATEGORY</u>	<u>CIVIL CATEGORY</u>	<u>CHEMICAL CATEGORY</u>
1st : NG YONG PONG, LEE WEI CHENG, LEWIS ONG YI SOONG, TAN YI JING AND LEE ZHI KHAI (TAYLOR'S UNIVERSITY)	1st : CHUA MENG KIAT (ASIA PACIFIC UNIVERSITY)	1st : KHAIRUL AFIQ BIN ROHAYZI (UNIVERSITY MALAYA)	1st : KOH HAU SERN (XIAMEN UNIVERSITY MALAYSIA)
2nd : BENJAMIN TING SHYR SHIUAN, ZAID ANWAR, CHEW WEE MEEN, JERRICK TEH KHER MING, LIM WAN TING AND JEFFERSON MITCHELL ANAK AYING (CURTIN UNIVERSITY MALAYSIA)	2nd : NURIN SABRINA BINTI MUHAMMAD KHAIRI (UNIVERSITI SAINS ISLAM MALAYSIA)	2nd : VALENTINA NICSON (HERIOT-WATT UNIVERSITY MALAYSIA)	2nd : SEE XING SUANG (UNIVERSITI KEBANGSAAN MALAYSIA)
3rd : MUHAMMAD IZZAT FARHAN AND NURUL HANNANI ABDUL HADI (UNIVERSITI KEBANGSAAN MALAYSIA)	3rd : CHAN SWEE HAN, THARABAN KEJANDRAN, NASUHA ISKANDAR, AHMED ALINAI AND EZLAAN IRRIVAN (TAYLOR'S UNIVERSITY)	3rd : SAMANTHA NASSALI, AL-BETUL SALEH OUMER ALI SHEK, IBRAHIM ABDUL SATTAR, WILLA YASSIN AND LUSI KATARINA (SEGI UNIVERSITY)	3rd : CHEN WEI XIN (UNIVERSITI KEBANGSAAN MALAYSIA)

Conclusion

- Inculcate teamwork, get more for university
- Prepare staff and students for professional work, and prepares students for the competitive world. At the same time, university will get the attention of the public and the government
- Engage students with industrial works, it will provide students and staff exposure and link to real issues and even business prospects

Thank You!