# Say Hi to SDGs!
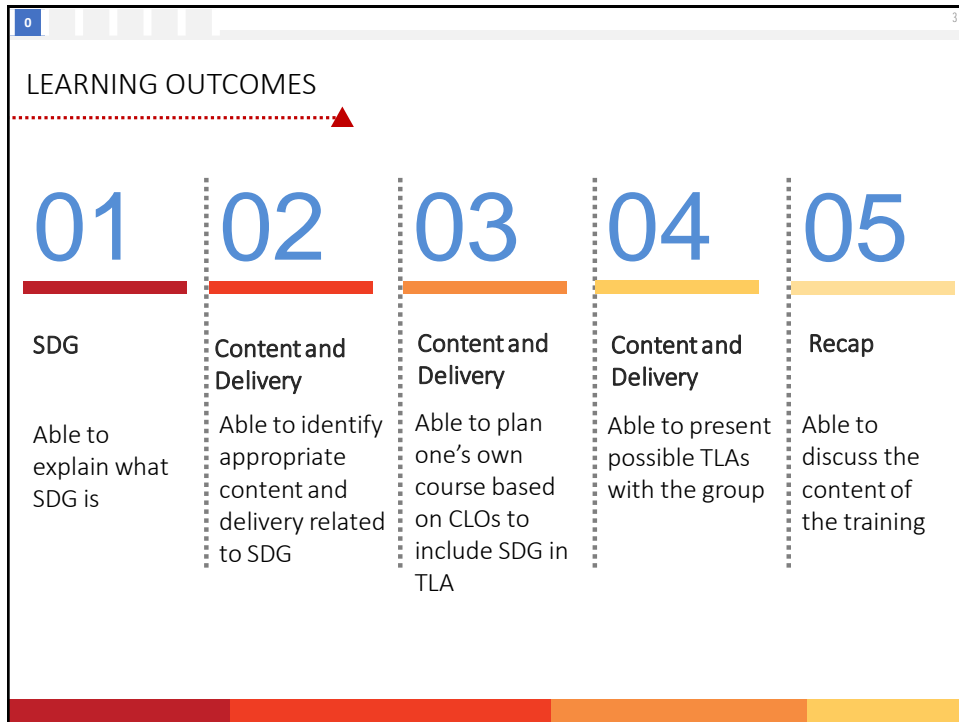
Nor K Noordin, *PhD, PEng, PTech*
**@UTEM**
06.03.2023

---

# AGENDA

01| Introduction to SDG

02| SDG in content and delivery

03| UPM Case Study

04| Activity

05| Q & A and Discussion

## LEARNING OUTCOMES

| 01 | 02 | 03 | 04 | 05 |
|---|---|---|---|---|
| SDG | Content and Delivery | Content and Delivery | Content and Delivery | Recap |
| Able to explain what SDG is | Able to identify appropriate content and delivery related to SDG | Able to plan one's own course based on CLOs to include SDG in TLA | Able to present possible TLAs with the group | Able to discuss the content of the training |

## APA ITU SDGs?

*Sustainable Development Goals (SDGs)* atau Matlamat Pembangunan Mampan adalah set 17 matlamat global yang telah ditetapkan oleh Perhimpunan Agung Pertubuhan Bangsa-Bangsa Bersatu pada tahun 2015.

*Sustainable Development Goals* (SDGs) meliputi isu pembangunan sosial dan ekonomi. **Konsep 5P (*People, Planet, Prosperity, Peace, Partnership*)** membuktikan bahawa 17 matlamat global ini bersifat menyeluruh.

*ESG (Environmental, Social and Governance)* menjadi kriteria penting bagi menilai kesan amalan dan pelaksanaan sebuah organisasi bagi mencapai *SDGs (Sustainable Development Goals).*

# MYSUN CONSORTIUM



---

## MYSUN 2020-2023
### PROJECT INFORMATION

MySUN is a **NATIONAL STRUCTURAL ACTION** in Malaysia which meets Region 6 priority in **Governances, Strategic Planning and Management of Higher Education Institutions** under Category 2 – **Improving management and operation of Higher Education Institutions.**
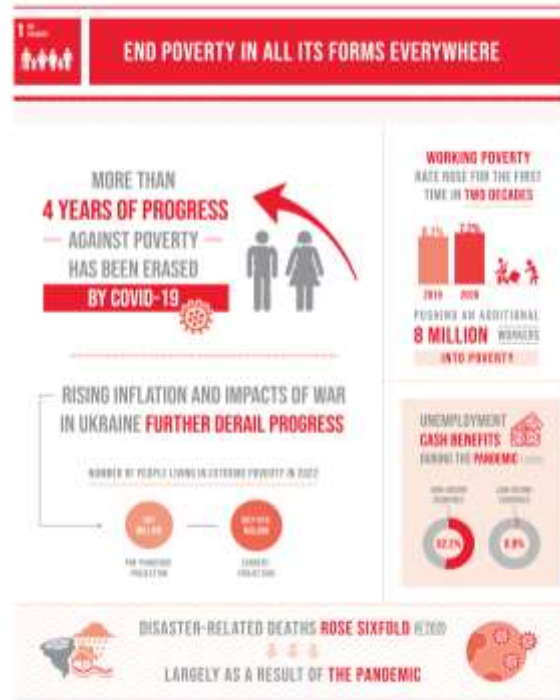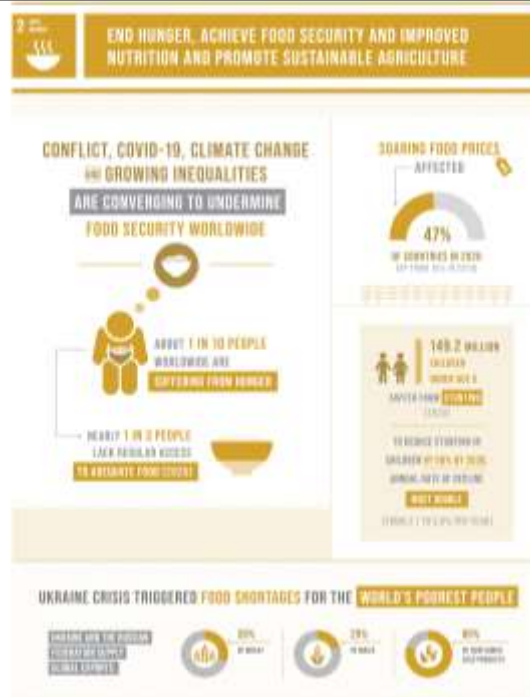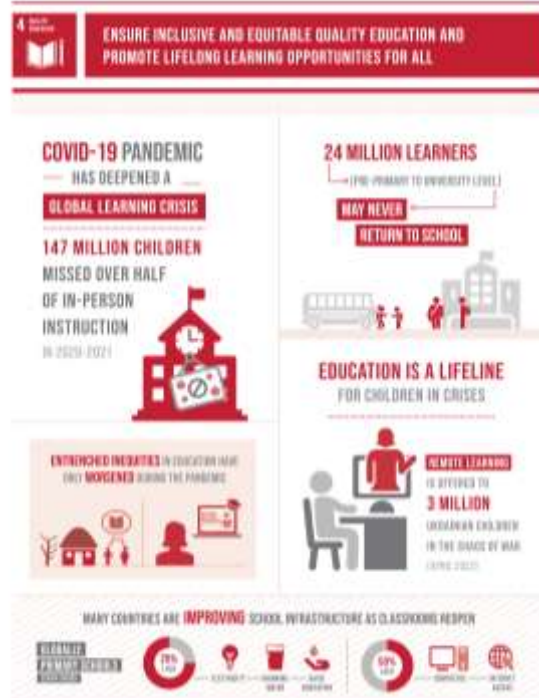
**KONSEP 5P SDGs**



# JOM KENALI SDGs

**SUMBER : UN SDG REPORT 2022**

**SUMBER : UN SDG REPORT 2022**

**SUMBER : UN SDG REPORT 2022**



**SUMBER : UN SDG REPORT 2022**
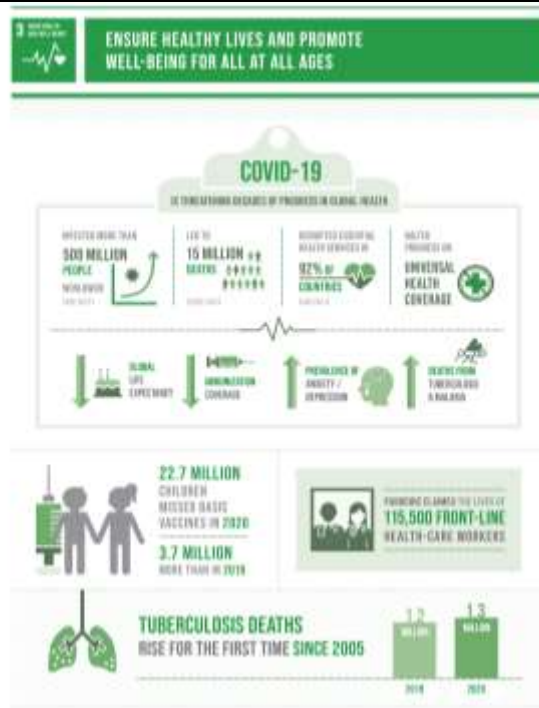
**SUMBER : UN SDG REPORT 2022**



**SUMBER : UN SDG REPORT 2022**

SUMBER : UN SDG REPORT 2022



SUMBER : UN SDG REPORT 2022
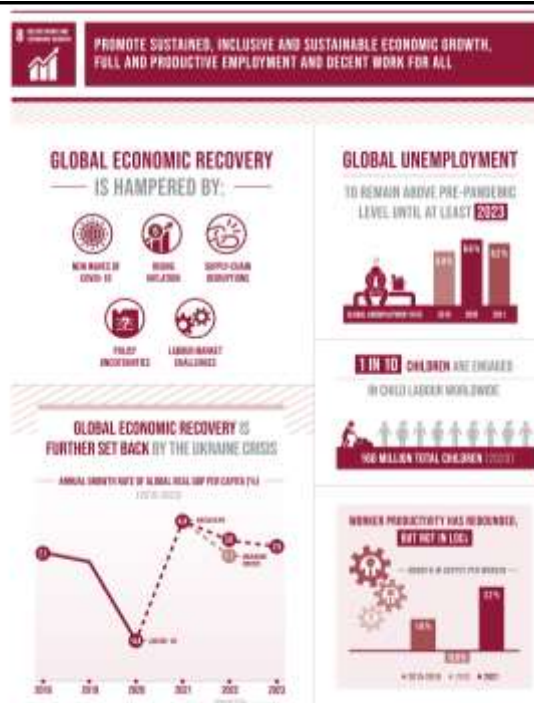
SUMBER : UN SDG REPORT 2022
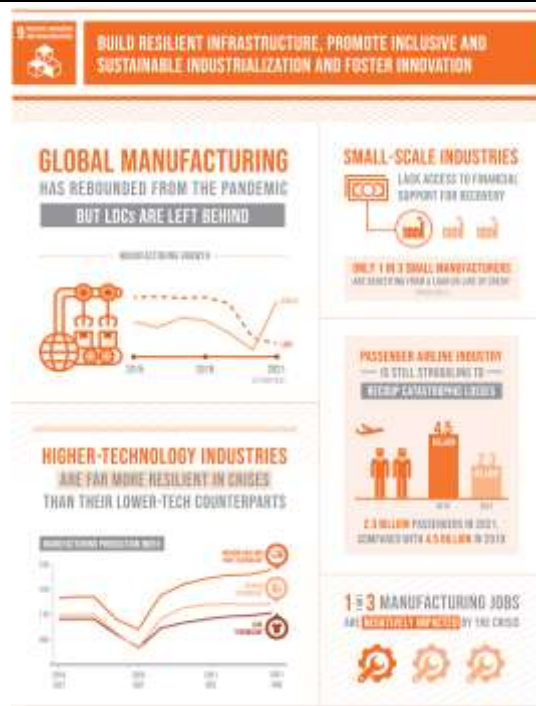


SUMBER : UN SDG REPORT 2022

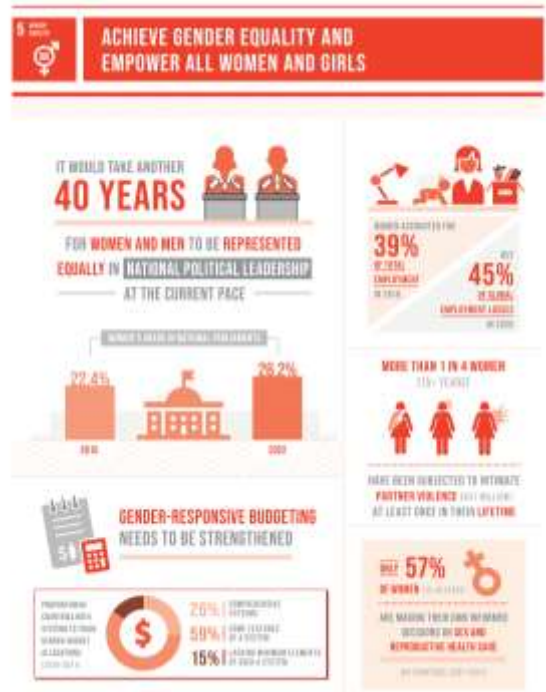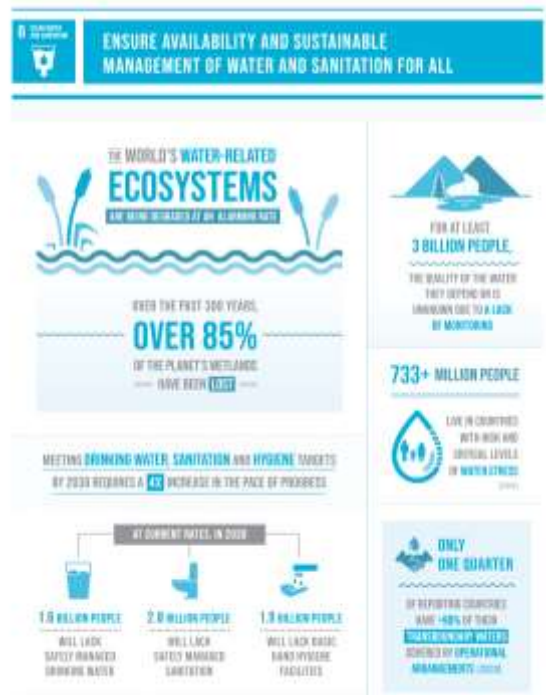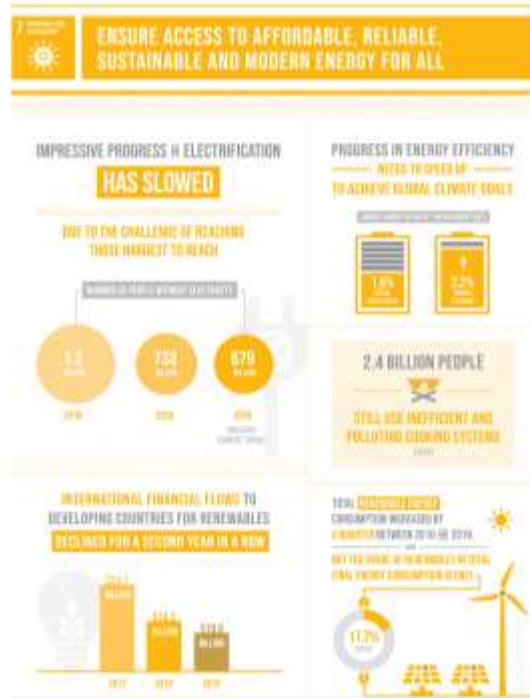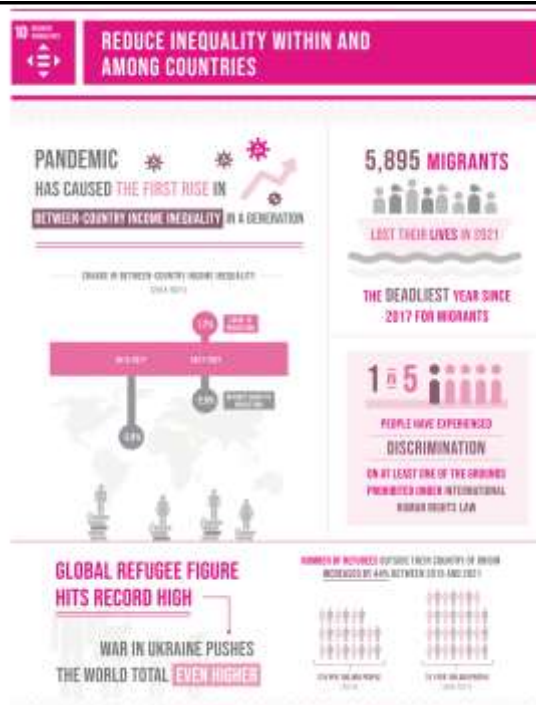**SUMBER : UN SDG REPORT 2022**



**SUMBER : UN SDG REPORT 2022**

**SUMBER : UN SDG REPORT 2022**
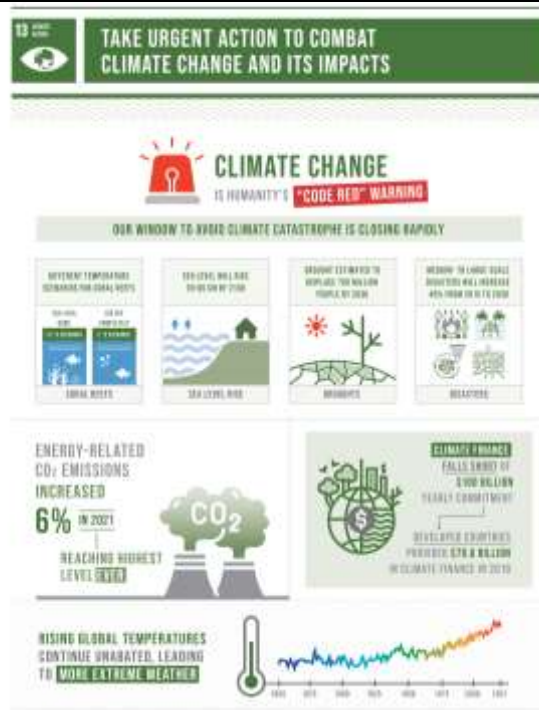


**SUMBER : UN SDG REPORT 2022**
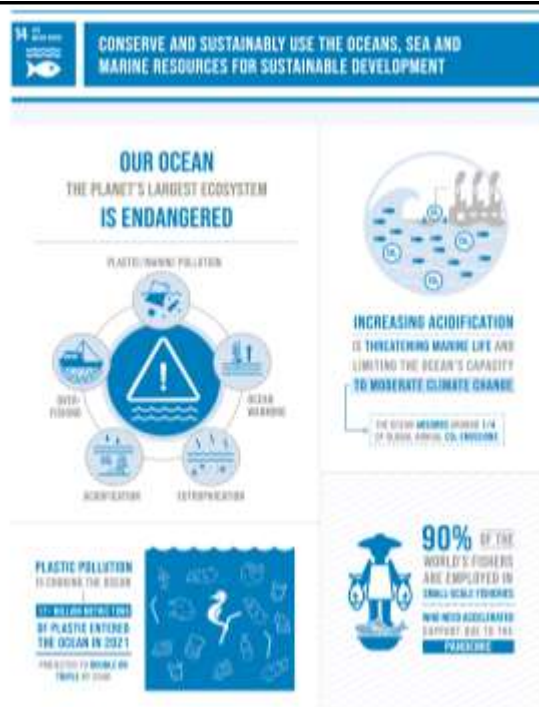
**SUMBER : UN SDG REPORT 2022**
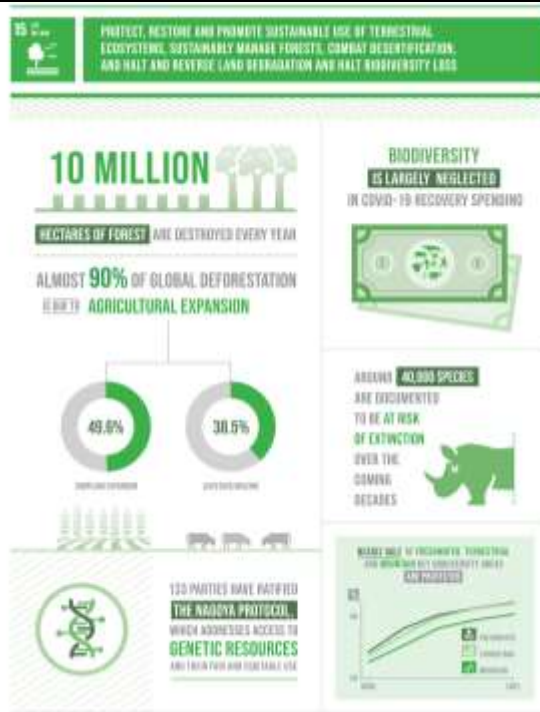


**SUMBER : UN SDG REPORT 2022**

**SUMBER : UN SDG REPORT 2022**

---
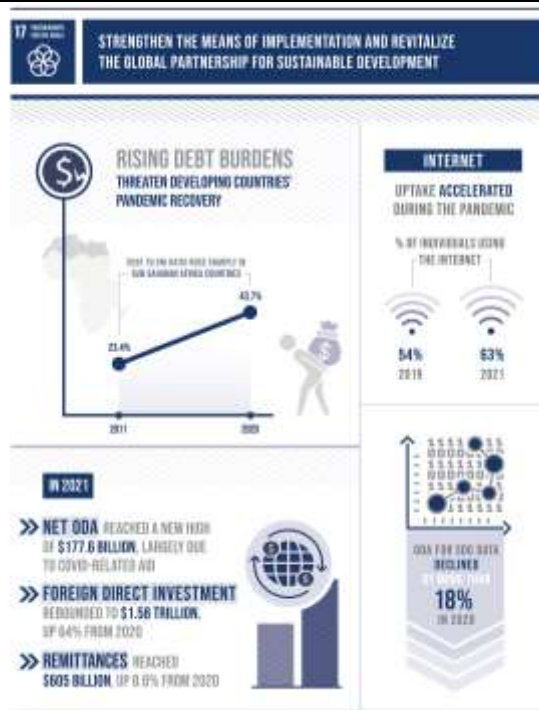


# UN Communications Campaign 2016

- Comprehensive communications materials in all 6 official UN languages, including the SDG icons, press releases
- Website www.un.org/sustainabledevelopment
- Social media

**@GlobalGoalsUN   #GlobalGoals**

United Nations DPI

28

## Take Action

www.un.org/sustainabledevelopment/takeaction

United Nations DPI                                    29

# 02
## SDG in Content and Delivery

## Engineering POs – 2023
(*to be released soon*)

**1- Engineering Knowledge**
Apply knowledge of mathematics, natural science, computing and engineering fundamentals, and engineering specialization as specified in WK1 to WK4 respectively to develop solutions to complex engineering problems.

**2- Problem Analysis**
Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences with holistic considerations for sustainable development* (WK1 to WK4)

**3- Design/Development of Solutions**
Design creative solutions for complex engineering problems and design systems, components or processes to meet identified needs with appropriate consideration for public health and safety, whole-life cost, net zero carbon as well as resource, cultural, societal, and environmental considerations as required (WK5)

**4- Investigation**
Conduct investigation of complex engineering problems using research methods including research-based knowledge, design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions (WK8)

**5- Tool Usage**
Create, select and apply, and recognize limitation of appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems. (WK2 and WK6)

**6- The Engineer team and the World**
Analyse and evaluate sustainable development impacts to: society, the economy sustainability, health and safety, legal frameworks, and the environment, in solving complex engineering problems (WK1, WK5, and WK7)

**7- Ethics**
Apply ethical principles and commit to professional ethics and norms of engineering practice and adhere to relevant national and international laws. Demonstrate an understanding of the need for diversity and inclusion (WK9)

**8- Individual and Collaborative Team Work**
Function effectively as an individual, and as a member or leader in diverse and inclusive teams and in multidisciplinary, face-to-face, remote and distributed settings (WK9)

**9- Communication**
Communicate effectively and inclusively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, taking into account cultural, language, and learning differences

**10- Project Management and Finance**
Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects in multidisciplinary environments;

**11- Life Long Learning**
Recognise the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change (WK8).

---

# MQF 2.0 LEARNING OUTCOMES

Five clusters of learning outcomes:

i. Knowledge and understanding (C)
ii. Cognitive skills (C)
iii. Functional work skills with focus on:
    a. Practical skills (P)
    b. Interpersonal skills (A)
    c. Communication skills (A)
    d. Digital skills (C)
    e. Numeracy skills (C)
    f. Leadership, autonomy and responsibility (A)
iv. Personal and entrepreneurial skills (A)
v. Ethics and professionalism (A)

**unesco** | UNESDOC Digital Library

**2 Education for Sustainable Development – a key instrument to achieve the SDGs**

**Box 2.** Target 4.7 of the SDGs

By 2030, ensure that all learners acquire knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

Source: United Nations, 2015

"A fundamental change is needed in the way we think about education's role in global development, because it has a catalytic impact on the well-being of individuals and the future of our planet. … Now, more than ever, education has a responsibility to be in gear with 21st century challenges and aspirations, and foster the right types of values and skills that will lead to sustainable and inclusive growth, and peaceful living together."

Irina Bokova, Director-General of UNESCO

"Education can, and must, contribute to a new vision of sustainable global development."

(UNESCO, 2015)

# EXAMPLES
## SDG in Content and Delivery

# Cognitive

| Table 1.2.1. Learning objectives for SDG 1 "No Poverty" | |
|---|---|
| **Cognitive learning objectives** | 1. The learner understands the concepts of extreme and relative poverty and is able to critically reflect on their underlying cultural and normative assumptions and practices. |
| | 2. The learner knows about the local, national and global distribution of extreme poverty and extreme wealth. |
| | 3. The learner knows about causes and impacts of poverty such as unequal distribution of resources and power, colonization, conflicts, disasters caused by natural hazards and other climate change-induced impacts, environmental degradation and technological disasters, and the lack of social protection systems and measures. |
| | 4. The learner understands how extremes of poverty and extremes of wealth affect basic human rights and needs. |
| | 5. The learner knows about poverty reduction strategies and measures and is able to distinguish between deficit-based and strength-based approaches to addressing poverty. |

# Socio Emotion

| | |
|---|---|
| **Socio-emotional learning objectives** | 1. The learner is able to collaborate with others to empower individuals and communities to affect change in the distribution of power and resources in the community and beyond. |
| | 2. The learner is able to raise awareness about extremes of poverty and wealth and encourage dialogue about solutions. |
| | 3. The learner is able to show sensitivity to the issues of poverty as well as empathy and solidarity with poor people and those in vulnerable situations. |
| | 4. The learner is able to identify their personal experiences and biases with respect to poverty. |
| | 5. The learner is able to reflect critically on their own role in maintaining global structures of inequality. |

# Behavior

| Behavioural learning objectives | 1. The learner is able to plan, implement, evaluate and replicate activities that contribute to poverty reduction. |
|---|---|
| | 2. The learner is able to publicly demand and support the development and integration of policies that promote social and economic justice, risk reduction strategies and poverty eradication actions. |
| | 3. The learner is able to evaluate, participate in and influence decision-making related to management strategies of local, national and international enterprises concerning poverty generation and eradication. |
| | 4. The learner is able to include poverty reduction, social justice and anti-corruption considerations in their consumption activities. |
| | 5. The learner is able to propose solutions to address systemic problems related to poverty. |

# Delivery

**Box 1.2.1b.** Examples of learning approaches and methods for SDG 1 "No Poverty"

Develop partnerships between schools and universities in different regions of the world (South and North; South and South)

Plan and run an awareness campaign about poverty locally and globally

Plan and run a student company selling fair trade products

Plan and implement local service-learning and/or engagement opportunities for empowering poor people, reducing their vulnerability to different hazards and increasing their resilience – in collaboration with NGOs, the private sector and/or community groups, etc.

Conduct a case study on poverty and wealth in selected countries (through desktop research) or at the local level (through excursions, doing interviews, etc.)

Provide internships within organizations addressing poverty

Develop an enquiry-based project around: "Is poverty increasing or decreasing?"

# Cognitive

| Table 1.2.4. Learning objectives for SDG 4 "Quality Education" | |
|---|---|
| **Cognitive learning objectives** | 1. The learner understands the important role of education and lifelong learning opportunities for all (formal, non-formal and informal learning) as main drivers of sustainable development, for improving people's lives and in achieving the SDGs. |
| | 2. The learner understands education as a public good, a global common good, a fundamental human right and a basis for guaranteeing the realization of other rights. |
| | 3. The learner knows about inequality in access to and attainment of education, particularly between girls and boys and in rural areas, and about reasons for a lack of equitable access to quality education and lifelong learning opportunities. |
| | 4. The learner understands the important role of culture in achieving sustainability. |
| | 5. The learner understands that education can help create a more sustainable, equitable and peaceful world. |

# Socio Emotion

| **Socio-emotional learning objectives** | 1. The learner is able to raise awareness of the importance of quality education for all, a humanistic and holistic approach to education, ESD and related approaches. |
|---|---|
| | 2. The learner is able through participatory methods to motivate and empower others to demand and use educational opportunities. |
| | 3. The learner is able to recognize the intrinsic value of education and to analyse and identify their own learning needs in their personal development. |
| | 4. The learner is able to recognize the importance of their own skills for improving their life, in particular for employment and entrepreneurship. |
| | 5. The learner is able to engage personally with ESD. |

# Behavior

| Behavioural learning objectives | 1. The learner is able to contribute to facilitating and implementing quality education for all, ESD and related approaches at different levels. |
|---|---|
| | 2. The learner is able to promote gender equality in education. |
| | 3. The learner is able to publicly demand and support the development of policies promoting free, equitable and quality education for all, ESD and related approaches as well as aiming at safe, accessible and inclusive educational facilities. |
| | 4. The learner is able to promote the empowerment of young people. |
| | 5. The learner is able to use all opportunities for their own education throughout their life, and to apply the acquired knowledge in everyday situations to promote sustainable development. |

# Content

**Box 1.2.4a.** Suggested topics for SDG 4 "Quality Education"

Education as a public good, a global common good, a fundamental human right and a basis for guaranteeing the realization of other rights

The Education 2030 agenda, and innovative and successful case studies from across the globe

The relevance of inclusive and equitable quality education and lifelong learning opportunities for all (formal, non-formal and informal learning, including the use of ICT) and at all levels for improving people's lives and sustainable development

Reasons for a lack of access to education (e.g. poverty, conflicts, disasters, gender inequality, lack of public financing of education, growing privatization)

Global attainment of literacy, numeracy and basic skills

Diversity and inclusive education

Basic skills and competencies needed in the 21st century

Knowledge, values, skills and behaviours needed to promote sustainable development

The concept of education for sustainable development (ESD), whole-institution approach as a key strategy to scale up education for sustainable development, and pedagogy for developing sustainability competencies

Youth empowerment and empowerment of marginalized groups

# Delivery

**Box 1.2.4b.** Examples of learning approaches and methods for SDG 4 "Quality Education"

Develop partnerships between schools, universities and other institutions offering education in different regions of the world (South and North, South and South)

Plan and run a quality education awareness campaign

Conduct a case study on the education system and access to education (e.g. enrolment in primary education) in selected communities or countries

Plan and run an ESD project at a school or university, or for the local community

Celebrate UN World Youth Skills Day (15 July), International Literacy Day (8 September) or World Teachers' Day (5 October); or take part in Global Action Week for Education

Organize ESD days at local, regional and national level

Develop an enquiry-based project: "What is a sustainable school?"

# 03
## UPM Case Study

# 03
UPM Case Study
01
*Curriculum*



**Program Level**

Credit: Dr Zakiah Ponrahono, UPM

# 03
## UPM Case Study
### 02
### *Engineers and Society*

---

# Engineers and Society @ UPM

Session 1: INTRODUCTION

## Course Synopsis

This course covers the engineers' profession, ethic and responsibility in relation to environmental, socio-economic, sustainability, safety and health issues, legal system, contract law, management and entrepreneurship. This course also involves application of engineering knowledge through joined activities with the community.
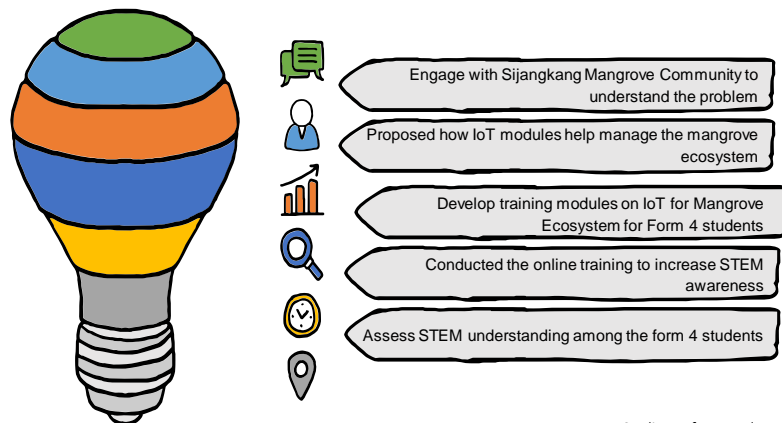
## Course Learning Outcomes

Students are able to:
1. Correlate the current issue of the environment, socio-economic and sustainability with sound engineering practice (C5)
2. Explain the ethical duties and responsibilities of engineers in society related to legal, management and entrepreneurship aspects (A3, EM, KK)
3. Apply their skills and engineering knowledge to carry out activities with the community (P4)

Credit: Prof. Ir Dr. Aduwati Sali, UPM

**Threats to Our Mangrove**

Climate Change

Pollution

Logging

Aquaculture

Agriculture

Sustainable Aquatic Resource Management in Mangrove Ecosystems via Internet of Things Application (MEITA)

MEITA



# So what we did was..

Engage with Sijangkang Mangrove Community to understand the problem

Proposed how IoT modules help manage the mangrove ecosystem

Develop training modules on IoT for Mangrove Ecosystem for Form 4 students

Conducted the online training to increase STEM awareness

Assess STEM understanding among the form 4 students

Credit: Prof. Ir Dr. Aduwati Sali, UPM

# Teaching and Learning Activities



MEITA: Mangrove Ecosystem via
Internet of Things Application

51

---

## How IoT Help Manage the Mangrove Ecosystem



*Research Project on Mangrove Monitoring Funded by Asia Connect*

*Water level/ temperature sensors*

*Location of the pole is near the entrance to Taman Rekreasi Paya Bakau Sijangkang*

Credit Pictures: Prof. Ir Dr. Aduwati Sali, UPM

Taman Rekreasi
Paya Bakau Kampung Sijangkang

**Emphasizing on Social Practices – Participation-Socio-emotional dimension**

Credit Pictures: Prof. Ir Dr. Aduwati Sali, UPM

Credit Framework: Prof. Dr. Alyani Ismail, UPM



**Teach Others to Learn,
They Learn More**

**Emphasizing on Academic Competency
- Social Practices dimension**

Credit Picture: Prof. Ir Dr. Aduwati Sali, UPM

Credit Framework: Prof. Dr. Alyani Ismail, UPM

# 03
## UPM Case Study
### 03 *F Y P*

Nature Inspired-Advanced Design of Water
Purification Filter System for Eco-Sustainable
and Smart Harvesting of Rain and Dripping
Air-Conditioner Water Using Internet of
Things

*Assoc Prof Dr Fazirulhisyam Hashim*
*UPM – NI Malaysia Sdn. Bhd. Research Collaboration Project (6300296-*
*10801)*

## MOTIVATION


*Monthly Rainfall Distribution in Malaysia (source: MetMalaysia)*

Malaysia produces an abundance of rainfall and non-revenue water (NRW), e.g., air-conditioner dripping water. Most people prefer to utilize treated water (from water tap) for daily use, which incur costs. Some may utilize the rainwater and NRW directly from its sources, but they may not be suitable for some applications (e.g., agriculture, for washing vehicles) due to inappropriate water parameters (pH, turbidity, chemical content).

## IMPACT

- Minimize NRW by treating them for daily domestic use such as toilet and nursery purposes.
- Optimize and reduce dependency on tap water (reducing water bill cost and operational cost), leading to sustainability, energy access and efficiency, and climate change effort.
- Produce baseline datasets and as a use case model for other organizations/premises in developing and applying a similar model framework.

## PROPOSED SOLUTION

Nature Inspired Water Purification Filter System for Rain and Dripping Air-Conditioner Water using IoT



IoT based monitoring system

---

# Remote-Monitoring of Harmful Algal Bloom Via Marine Toxin Biosensor Integrated LoRa for Food Security
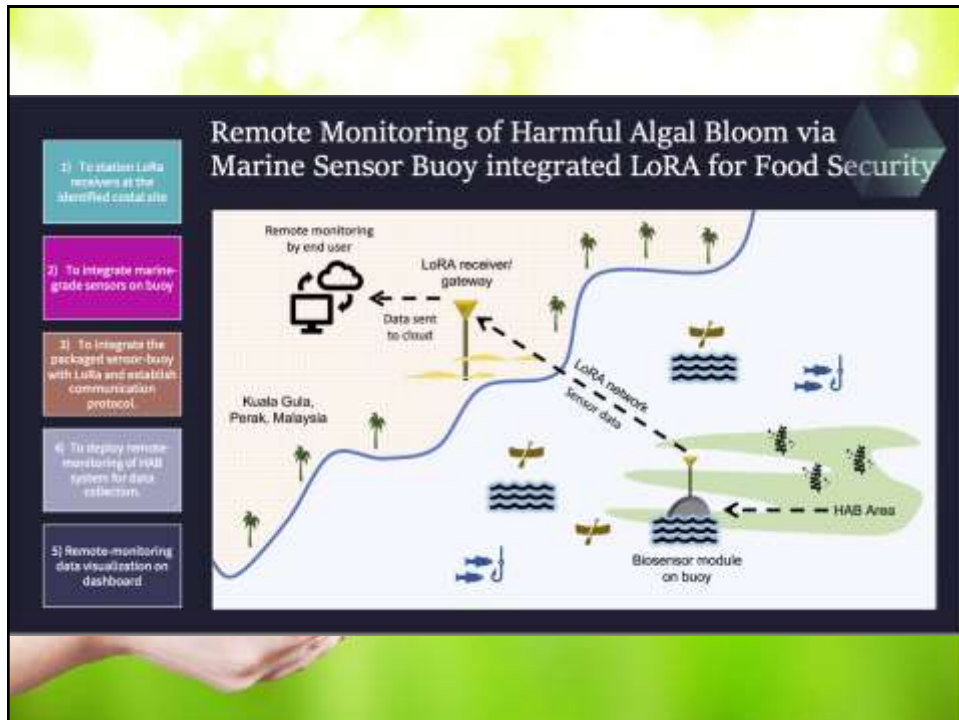
## Dr. Nadiah Husseini Zainol Abidin

Department of Computer and Communication Systems Engineering
Faculty of Engineering, Universiti Putra Malaysia

hza_nadiah@upm.edu.my

Remote Monitoring of Harmful Algal Bloom via Marine Sensor Buoy integrated LoRA for Food Security

# 04
## Activity

# ACTIVITY 1-01

## *Experience-it-Yourself*

List your course learning outcomes of your

- **Map your CLO to the most related SDG/s**
- **Identify possible topics/delivery you can craft for the Teaching & Learning Activity.**

Be prepared to share with the rest of the participants

(30 minutes)

# ANY QUESTIONS?

# 05
## Discussion and Q&A

# DEBRIEF

01| Introduction to SDG

04| Activity

02| SDG in content and delivery

05| Q & A and Discussion

03| UPM Case Study

# TERIMA KASIH