UTM
UNIVERSITI TEKNOLOGI MALAYSIA
RESEARCH UNIVERSITY

Washington Accord : Malaysia's Experience

Prof Abdul Halim Yatim, PhD, FIEM, PEng, SMIEEE

Dean of Faculty of Electrical Electrical Engineering,

Universiti Teknologi Malaysia

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

Topics of Presentation

- Introduction
- Accreditation Structure
- Washington Accord's Influence
- EAC Manual
- Present Challenges
- Accreditation Decision
- Conclusion

INSPIRING CREATIVE & INNOVATIVE MINDS

INTRODUCTION

Purpose of Accreditation

- satisfy BEM's requirements for registration as graduate engineers
- satisfy MQA's requirements under the national qualification framework
- satisfy PSD's requirements for employment in the government sector / grants provision

UTM

ACCREDITATION SYSTEM

HISTORICAL PERSPECTIVE

- 2008 EAC comprises BEM, IEM, MQA, PSD, Industry Representative
- 2007 establishment of MQA (replacing LAN) as the Malaysia Qualification Agency
- 2000 establishment of the Engineering Accreditation Council (EAC) comprising of BEM, IEM, LAN and PSD
- 1996 LAN (National Accreditation Board) established to ensure quality of private institution of higher learning
- 1967 BEM was established - joint accreditation with IEM
- 1959 initiated by IEM modeled after UK and Australia
- 1957 by Public Services Department (PSD) for admission to the Public Service

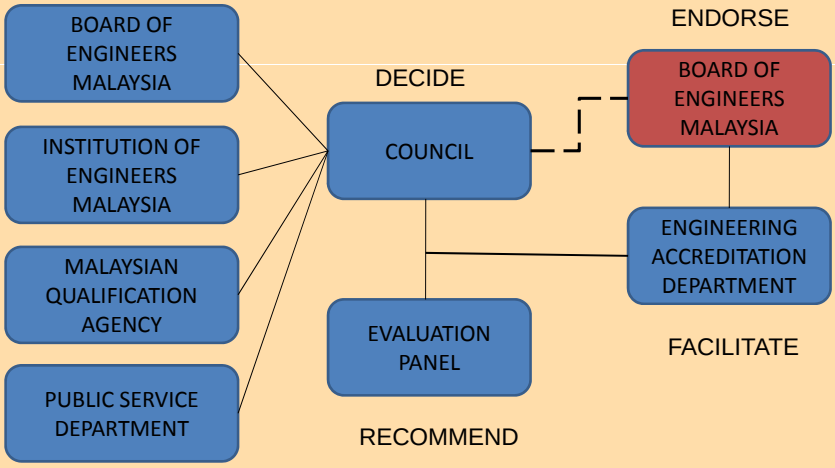
INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

ACCREDITATION STRUCTURE

INSPIRING CREATIVE & INNOVATIVE MINDS

Working Relationship



ENGINEERING ACCREDITATION COUNCIL 17 MEMBERS

- **Chairman (BEM)**
- **Deputy Chairman (IEM)**
- **5 members (BEM)**
- **5 members (IEM)**
- **3 members from Industry**
- **1 member (MQA)**
- **1 member (PSD)**
- *50:50 representation between academia & industry*

UTM

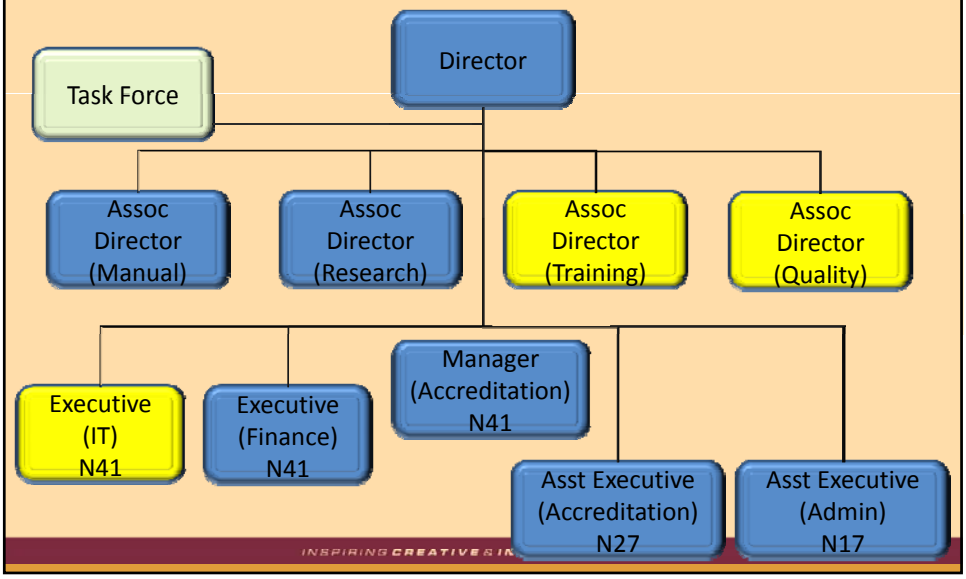
Evaluation Panel ~ 100 trained volunteers

- Chairperson (P.Eng)
- Two members (P.Eng)
  - one member with extensive academic experience and one member with extensive industrial experience

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

Engineering Accreditation Department



INSPIRING CREATIVE & IN

UTM

EAC TERMS OF REFERENCE

- formulate and update the accreditation policies and criteria
- approve detailed guidelines and operating procedures for accreditation
- decide on accreditation and submit for Board's endorsement
- establish and maintain a list of local and foreign accredited engineering programmes
- oversee the development and operation of accreditation and mutual recognition agreements with other countries

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

EAC TERMS OF REFERENCE (Cont…)

- keep the Board informed of the activities of EAC.
- advise the Board on public statements or representations that should be made in relation to engineering education.
- hold consultation meetings with universities as and when necessary.
- hold meetings at least 6 times per year.

INSPIRING CREATIVE & INNOVATIVE MINDS

WASHINGTON ACCORD'S INFLUENCE

International Agreements / Networks

EDUCATION		PRACTICE
WASHINGTON ACCORD	4 YEARS	ENGINEERS MOBILITY FORUM
SYDNEY ACCORD	3 YEARS	APEC ENGINEER
DUBLIN ACCORD	2 YEARS	ENGINEERING TECHNOLOGISTS MOBILITY FORUM
FEANI / EUR-ACE / ENEE (EUROPE)	3 YEARS	
NABEEA (ASIA)		
UPADI (CENTRAL & SOUTH AMERICA)		

INTERNATIONAL ENGINEERING ALLIANCE / INTERNATIONAL ENGINEERING MEETING (IEM)

Washington Accord

- Signed in 1989
- Recognises substantial equivalence in the accreditation of qualifications in professional engineering, normally of four years duration.
- 6 years peer review cycle

INSPIRING CREATIVE & INNOVATIVE MINDS

WASHINGTON ACCORD FULL SIGNATORY	PROVISIONAL STATUS
Australia - Engineers Australia (*1989*) **Canada** - Engineers Canada (*1989*) **Chinese Taipei** - Institute of Engineering Education Taiwan (*2007*) **Hong Kong China** - The Hong Kong Institution of Engineers (*1995*) **Ireland** - Engineers Ireland (*1989*) **Japan** - Japan Accreditation Board for Engineering Education (*2005*) **Korea** - Accreditation Board for Engineering Education of Korea (*2007*) **Malaysia** – Board of Engineers Malaysia (*2009*) **New Zealand** - Institution of Professional Engineers NZ (*1989*) **Singapore** - Institution of Engineers Singapore (*2006*) **South Africa** - Engineering Council of South Africa (*1999*) **United Kingdom** - Engineering Council UK (*1989*) **United States** - Accreditation Board for Engineering and Technology (*1989*)	**Germany** - German Accreditation Agency for Study Programs in Engineering and Informatics **India** - National Board of Accreditation of All India Council for Technical Education **Pakistan** – Pakistan Engineering Council **Russia** - Russian Association for Engineering Education **Sri Lanka** - Institution of Engineers Sri Lanka **Turkey** – MUDEK

Washington Accord (WA) Visits (2002 – 2008)

- Sponsor (UiTM, UIA)
- 1st Mentor (MMU, UKM)
- 2nd Mentor (UTeM, UTM)
- 3rd Mentor (UNIMAP, UTP)
- 4th Mentor (KLIUC, UNITEN) & (ADM)
- 5th Mentor (UiTM) & (ADM)
- 1st Reviewer (UPM, UKM)
- 2nd Reviewer (ADM)
- Evaluation Panel (UPM, UKM)

Public Universities: 7
Private Universities: 4

Academic Education

Differentiating Characteristic: Educational Depth and Breadth

Engineer – Washington Accord	Engineering Technologist – Sydney Accord	Engineering Technician – Dublin Accord
Completion of an accredited program of study typified by four or more years of post-secondary study	Completion of an accredited program of study typified by three or more years of post-secondary study	Completion of an accredited program of study typified by two or more years of post-secondary study

Modern Tool Usage

Differentiating Characteristic: Level of Understanding of the Appropriateness of the Tool

Engineer – Washington Accord	Engineering Technologist – Sydney Accord	Engineering Technician – Dublin Accord
Create, select, and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations	Select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to broadly defined engineering activities, with an understanding of the limitations	Apply appropriate techniques, resources, and modern engineering tools to well-defined engineering activities, with an awareness of the limitations

Ethics

Differentiating Characteristic: None

Engineer – Washington Accord	Engineering Technologist – Sydney Accord	Engineering Technician – Dublin Accord
Understand and commit to professional ethics, responsibilities, and norms of engineering practice	Understand and commit to professional ethics, responsibilities, and norms of engineering practice	Understand and commit to professional ethics, responsibilities, and norms of engineering practice

UTM

Washington Accord Recognition

- Programmes accredited prior to acceptance of the country's accreditation system as a full signatory are not recognised
- Licensure/registration of graduates from recognised programmes rests with the receiving country
- Each full signatory encourages the licensing body in its own country to accept the substantial equivalence of engineering education programmes accredited by other signatories

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

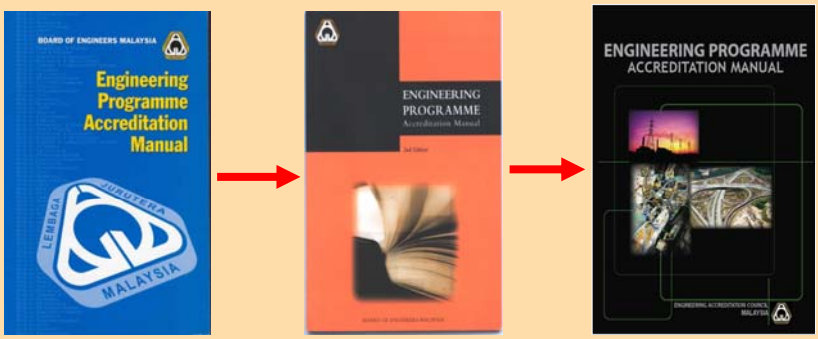
EAC MANUAL

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

EAC Manual

- From input based to outcome based



1999 2003 2006

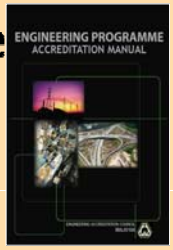
UTM

EAC Manual

- The 1999 version (blue book) incorporated the generic attributes (also known as outcomes) of engineering graduates.
- The 2003 version (orange book) incorporated minor changes which included making industrial training compulsory.
- The 2006 version makes the outcome based approach more explicit.

UTM

Comments by Mentors on the EAC Manual (2006)



2006 edition

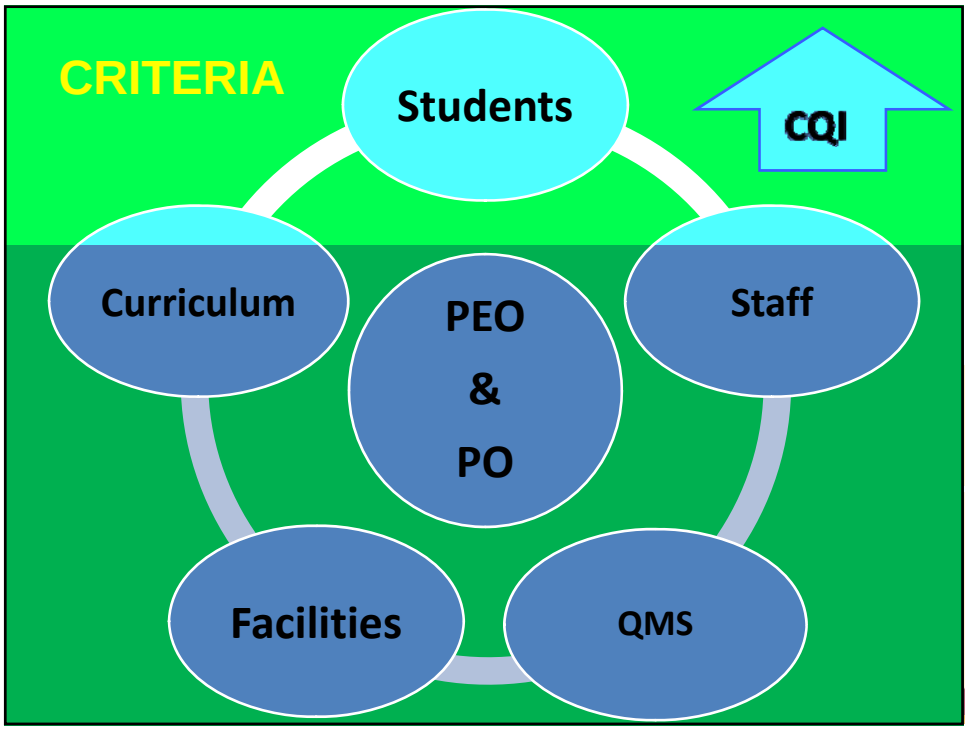
Prof. Alan Bradley

Prof. Skip Fletcher

Dr. Alex Wong

- "Provide very significant improvement to quality & consistency"
- "Provide a sound, outcomes based accreditation framework. Rigorous application of this accreditation system is essential to deliver outcomes substantially equivalent to those used by the signatories to the Washington Accord".

INSPIRING CREATIVE & INNOVATIVE MINDS



UTM

Accreditation Decision (1999 – 2006)

(a) Academic Curriculum (45%)
(b) Student (15%)
(c) Academic and Supporting Staff (15%)
(d) Facilities (15%)
(e) Quality Management System (15%)

- Full Accreditation for 5 Years: An Overall Score of a Minimum of 70%, and a minimum of 50% for each Category
- Conditional Accreditation
- Accreditation Declined

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

EAC Manual

- The 2007 revision introduced the qualitative evaluation with minor changes to the criteria.
  - Changing from quantitative to qualitative evaluation complicates further the decision making as it becomes more subjective.
  - Evaluators are expected to triangulate the information/evidence obtained before arriving at a decision.

INSPIRING CREATIVE & INNOVATIVE MINDS

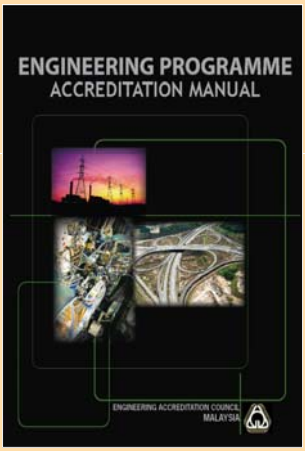
UTM

Focus

- Engineering education **content and level** are maintained
- Programme Continual Quality Improvement (**CQI**)
- Outcome-based Engineering Education (**OBE**) Programme
- Systematic (**QMS**)

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM



INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

Outcomes

a. Ability to acquire and apply knowledge of science and engineering fundamentals
b. Acquiring in-depth technical competence in a specific engineering discipline
c. Ability to undertake problem identification, formulation and solution
d. Ability to utilise systems approach to design and evaluate operational performance
e. Understanding of the principles of sustainable design and development
f. Understanding of professional and ethical responsibilities and commitment to these

UTM

Outcomes (cont)

g. Ability to communicate effectively, not only with engineers but also with the community at large
h. Ability to function effectively as an individual and in a group with the capacity to be a leader or manager as well as an effective team member
i. Understanding of the social, cultural, global and environmental responsibilities of a professional engineer, and the need for sustainable development
j. Recognising the need to undertake life-long learning, and possessing/acquiring the capacity to do so

UTM

Accreditation Policy

- Accreditation is voluntary

Accreditation Process:

- Request from IHL for programme to be accredited
- Focus on outcomes
- Involves quality assurance systems and processes set in place

UTM

Accreditation Policy (cont)

Accreditation cycle: 5 years; IHL must apply 6 months prior to expiry

Programmes: Each programme need to apply separately; Failure at one location will affect other locations (for the same degree)

Application & Preparation for Accreditation Visit: MQA; complete document for submission

Accreditation Policy (cont)

Accreditation Evaluation: to verify compliance; Qualitative assessment

Accreditation Decision and Result: Full (5 years); < 5 years; Decline; Defer

- Decision thru MQA

Revised Accredited Programme: IHL to advise EAC of changes

Approval to Conduct a Programme: Submit to MQA (as in Section 9)

Accreditation Policy (cont)

Publication of Accreditation Status: MQA & EAC list

Procedures of Appeal: In writing within 2 weeks; appeal documents in 4 weeks

- Accreditation Appeal Board – President BEM, President IEM, MQA Chairman or their nominated rep, chaired by BEM

Confidentiality: All submitted documents

Expenses: IHL bears cost

Conflict of Interest: Withdraw

PRESENT CHALLANGES

Challenges

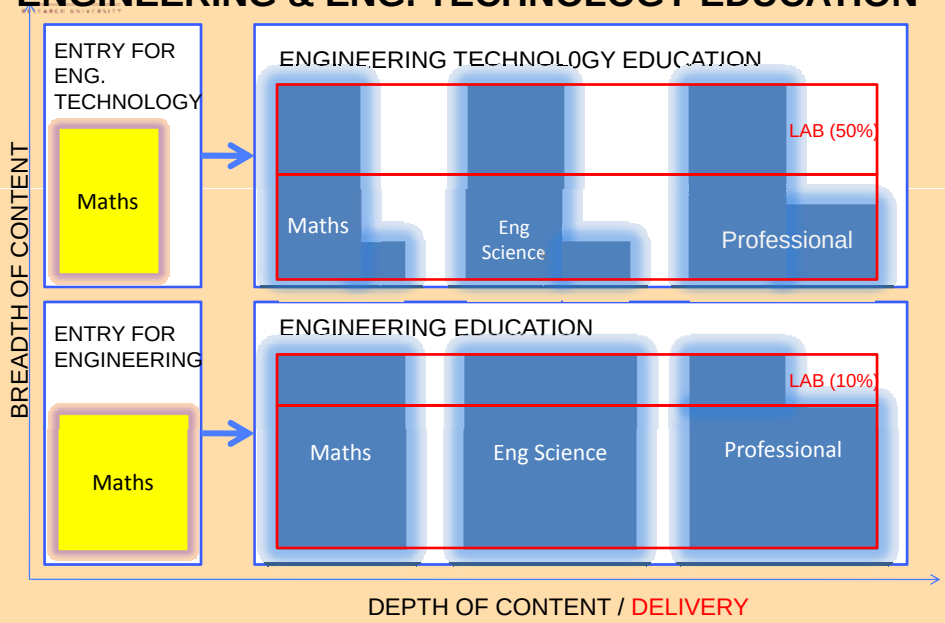
- **Paradigm Shift – Outcome & Quality**
- **International benchmarking**
- **Maintain Fundamentals while Encourage Inclusion of Latest Technology Advancement in the Curriculum**
- **Allow Academic Innovation and Creativity**
- **Avoid Side-tracked**
- **Variety of Modes of Delivery**

CULTURE CHANGE - QUALITY

- Knowledge
- Behaviour
- Attitude

- Management Commitment
- Resources
- Establish, Maintain & Continually Improve System

ENGINEERING & ENG. TECHNOLOGY EDUCATION



UTM

Characteristics of OBE curricula

- Have programme objectives, programme outcomes, course outcomes and performance indicators.
- Stated objectives and outcomes can be assessed and evaluated.
- Centered around the needs of the students and the stakeholders.

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

Characteristics of OBE curricula (cont)

- Learning outcomes are intentional and assessed using suitable performance indicators.
- Programme objectives address the graduates attainment in their career within 3-5 years after their graduation.
- Programme outcomes (abilities attained by students before they graduate) are formulated based on the programme objectives – TOP DOWN.

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

Characteristics of OBE curricula

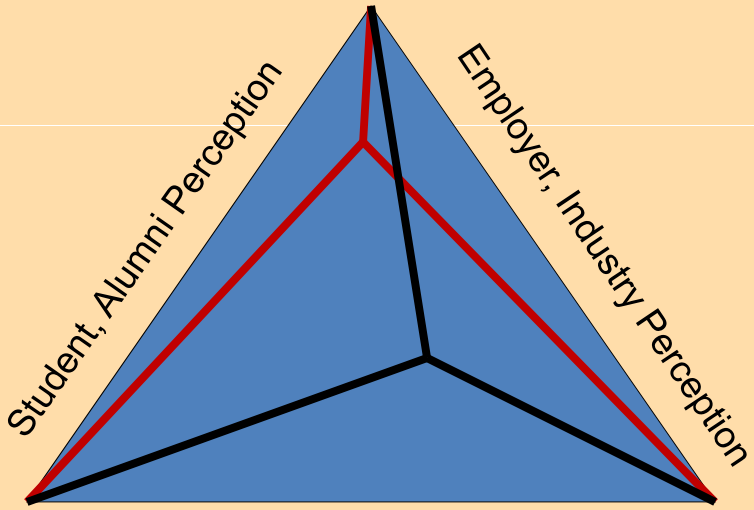
(cont)

- Programme outcomes address Knowledge, Skills and Attitudes to be attained by students.
- Course outcomes must satisfy the stated programme outcomes. There is no need for ANY (individual) course to address all program outcomes.
- Teaching/ Learning method may have to be integrated to include different delivery methods to complement the traditional Lecturing method.

INSPIRING CREATIVE & INNOVATIVE MINDS

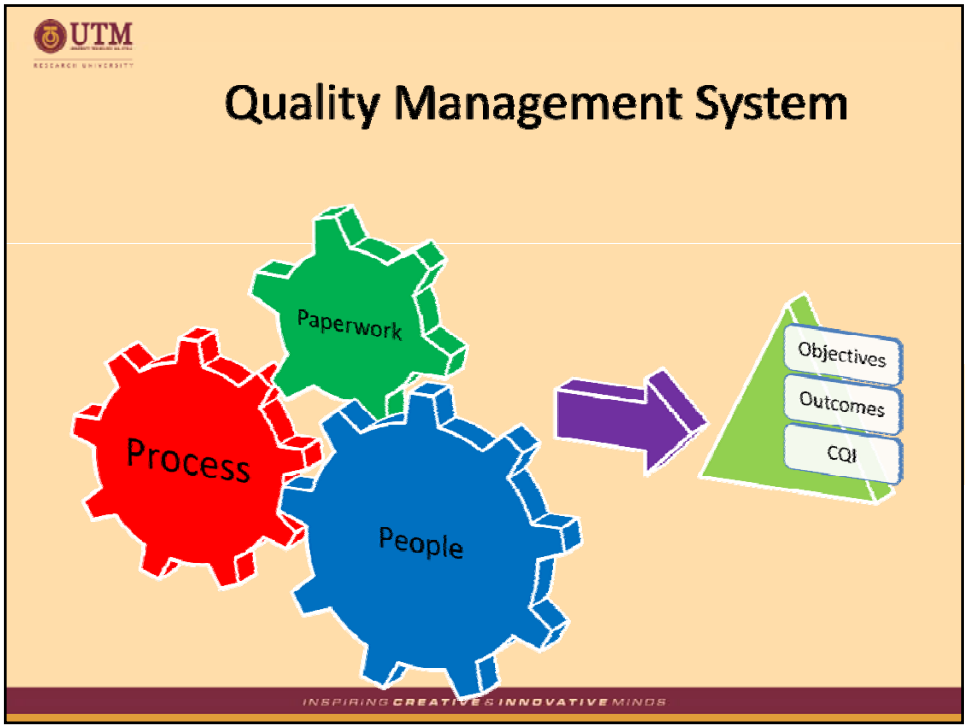
UTM

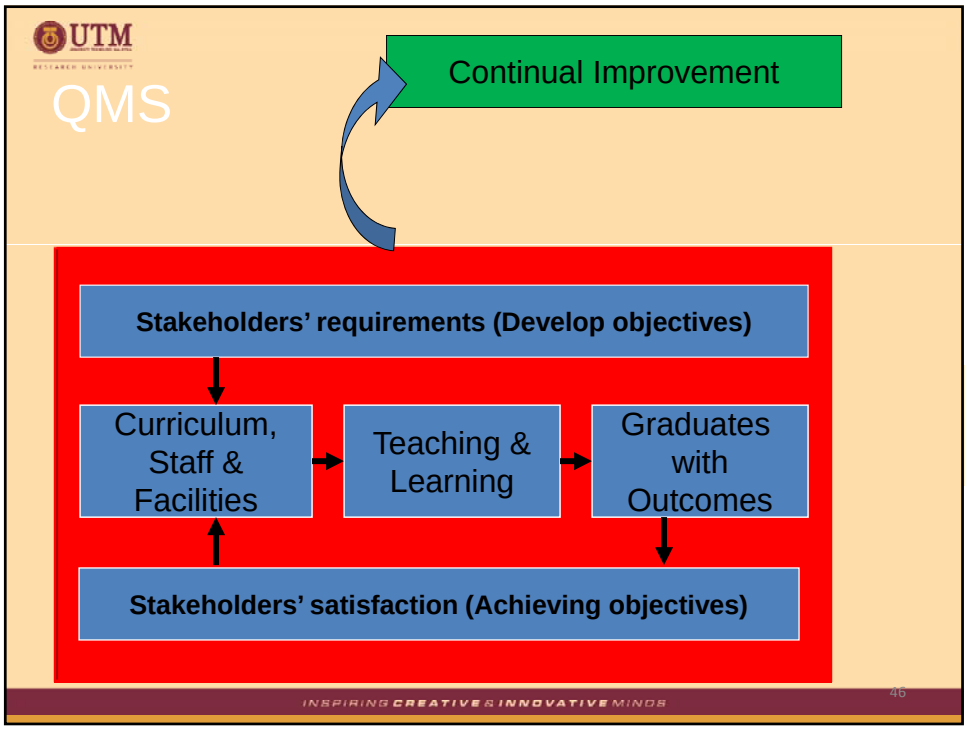
MEASURE & EVALUATE



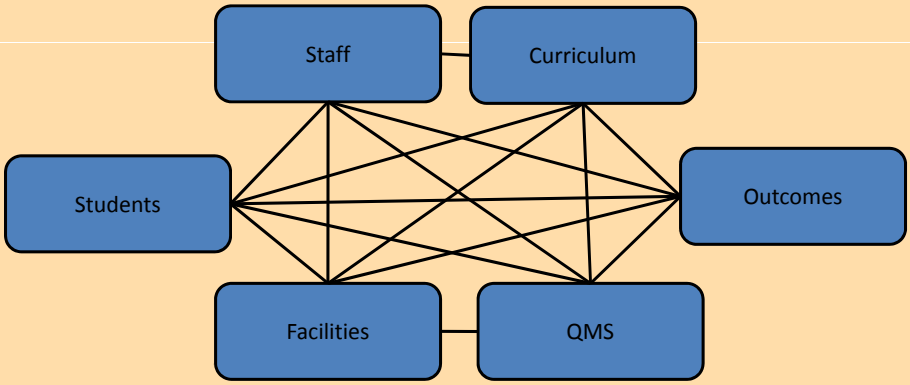
University Assessment & Evaluation

INSPIRING CREATIVE & INNOVATIVE MINDS


UTM
Quality Management System
Paperwork
Process
People
Objectives
Outcomes
CQI
INSPIRING CREATIVE & INNOVATIVE MINDS


UTM
QMS
Continual Improvement
Stakeholders' requirements (Develop objectives)
Curriculum, Staff & Facilities
Teaching & Learning
Graduates with Outcomes
Stakeholders' satisfaction (Achieving objectives)
INSPIRING CREATIVE & INNOVATIVE MINDS
46

Triangulation



ACCREDITATION DECISION

UTM

ACCREDITATION DECISION

- *Decline accreditation or (0) year*
- *Five years accreditation*
- *Five years accreditation and interim report to be submitted (5-2) or 3+2*
- *Two years accreditation and interim report may be requested*
- *Defer Accreditation*

INSPIRING CREATIVE & INNOVATIVE MINDS

UTM

CONCLUSION

INSPIRING CREATIVE & INNOVATIVE MINDS

CONCLUSION

- Challenges
  - IHL: OBE Approach ; Improving Standards
  - EAC: Changing Paradigm ; Innovative & Creative Programmes
- Maintaining Standards
- Engineering Education clearly defined
- Retain trained Panels
- Consistency in decisions
- Motivate IHLs

THANK YOU

INSPIRING CREATIVE & INNOVATIVE MINDS