Develop and Implement Properly Curriculum Revision Based on OBE Framework

Chavalit Wongse-ek

AUN-QA Expert and Lead assessor

Veeradeth Panvisavas

AUN-QA Lead assessor, Mahidol University

Learning Outcomes

2

- **Formulate** and **Write** the statement of Expected Learning Outcomes (ELOs)
- **Curriculum Design** Using Backward design Technique
- **Translate** ELOs to programme structure and content
- **Design** a Course syllabi

Workshop:

3

E1: Formulating Expected Learning Outcomes (ELOs)
E2: Backward curriculum design
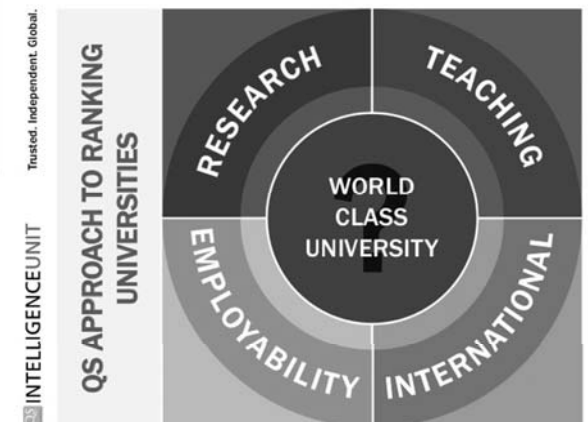E3: Construct a programme structure and curriculum map
E4: Design a course syllabi

4

THE WORLD CLASS UNIVERSITY

WORLD CLASS EXCELLENCE!

THE WORLD UNIVERSITY RANKINGS
POWERED BY THOMSON REUTERS

BE PART OF A WORLD-CLASS UNIVERSITY

Trusted. Independent. Global.

QS INTELLIGENCEUNIT

QS APPROACH TO RANKING UNIVERSITIES

RESEARCH TEACHING EMPLOYABILITY INTERNATIONAL

WORLD CLASS UNIVERSITY

Mahidol University is determined to be a World Class University (WCU)

5

Salmi, J. 2009. The Challenge of Establishing World-Class Universities. Washington DC: The World Bank.
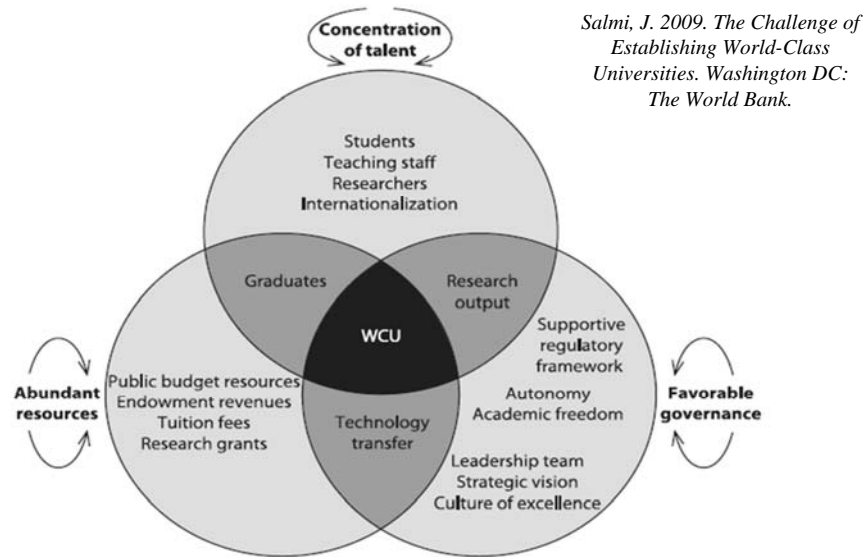
Graduates in 21st Century

6

Challenges for Tomorrow´s Higher Education

7

- The disruptive role played by technology
- Student rather than Teacher Centered
- Individualized and Decentralized
- Growth of online and competency-based education
- Smart classrooms or from outside and digitally interconnected
- Market hire for skills and not for degrees/diplomas
- Market pressure for faster degree programs
- Rise of alternative credentials

ASIIN Global Conference 2019.

8

15 large multinational companies recently announced that no college degree is required to apply

QUARTZ

Apple, IBM, and Google don't care anymore if you went to college

"Companies will hire the candidates whose experience and skills best suit them for the job. Many of those successful applicants will have university degrees. Some of them will not."
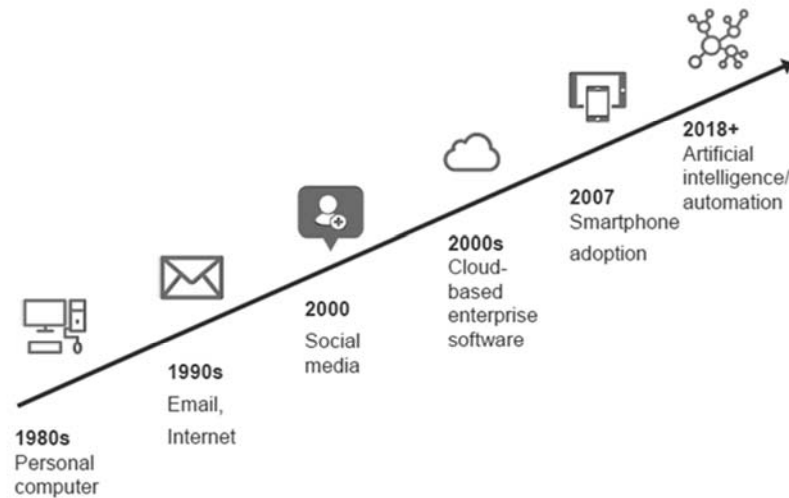
SOURCE: Quartz; Glassdoor

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Technology is remaking the workplace rapidly

- **1980s** Personal computer
- **1990s** Email, Internet
- **2000** Social media
- **2000s** Cloud-based enterprise software
- **2007** Smartphone adoption
- **2018+** Artificial intelligence/ automation

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Datuk Ir. (Dr.) Abdul Rashim Hashim

Vice Chancellor, Universiti Malaya
26 July 2018

With the advent of <u>disruptive technologies</u>, how do universities face and/or address this issue?

As the <u>era shifts in favour of the younger generation</u>, they will have different expectations and thoughts as to what universities have to offer, and

<u>universities</u> also have to continuously strive to see what is relevant in the community and society to better equip them to become a global citizen that has international employability.

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1

การปรับปรุงเกณฑ์มาตรฐานระดับอุดมศึกษา

และ มคอ.

ให้ตอบโจทย์มาตรฐานการเรียนรู้ในยุคปัจจุบัน

คณะทำงานขับเคลื่อนและติดตามนโยบายของรัฐมนตรีว่าการกระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัยและนวัตกรรม

(ด้านกรอบมาตรฐานคุณวุฒิระดับอุดมศึกษา)

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2

แนวคิดของการ ปรับเปลี่ยน

- สอดคล้องกับการเรียนรู้ในยุคปัจจุบัน
- ผลลัพธ์การเรียนรู้ ทักษะในศตวรรษ 21
- ลดภาระหลักสูตรคุณภาพ ช่วยเหลือหลักสูตรต้องการพัฒนา
- เปิดโอกาสการพัฒนาหลักสูตรข้ามศาสตร์
- เปิดโอกาสเอกชนเข้ามาร่วมสร้างหลักสูตร
- ปลดล็อค เพื่อปฏิรูปอุดมศึกษาไทย

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3 ประเด็นปรับเปลี่ยนเกณฑ์มาตรฐานในระดับปริญญาตรี

1 ปรับเปลี่ยนการจัดการเรียนการสอนหมวดวิชาศึกษาทั่วไป เน้นการบ่มเพาะ "บุคลิกภาพ (Character)" บัณฑิตเป็นมนุษย์ที่สมบูรณ์สอดคล้องกับศตวรรษที่ 21 มีความเข้าใจธรรมชาติ ตนเอง ผู้อื่น และสังคม และเน้นการบูรณาการหมวดวิชา ศึกษาทั่วไป สอดแทรก ผสมผสานที่สอดรับ กลมกลืน และเป็นเนื้อเดียวกันอย่างเป็น ระบบกับหมวดวิชาหลักและเฉพาะของวิชาชีพ

2 การลงทะเบียนในแต่ละภาค ให้อิสระกับแต่ละ หลักสูตร เพื่อให้เกิดความคล่องตัวและสอดคล้อง กับศาสตร์ที่จะศึกษา หรือ การศึกษาข้ามศาสตร์

3 การประกันคุณภาพ ให้ความคล่องตัวกับสถาบัน โดยให้สถาบันกำหนด

- เพื่อการจัดระบบ การศึกษาแบบ ใหม่
- หลักสูตรข้าม ศาสตร์ ร่วมกับ หน่วยงาน ภายนอก
- การสร้างคุณค่า มนุษย์ และ ทักษะในยุค ศตวรรษที่ 21

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4 ประเด็นปรับเปลี่ยนเกณฑ์มาตรฐานในระดับบัณฑิตศึกษา

1 เพื่อตอบสนองหลักสูตรได้หลากหลายมากขึ้น ได้แก่ Multi-discipline, Inter-discipline, Cross-discipline, Trans-discipline, Broadband-discipline และให้อาจารย์ข้ามสาขาสามารถมาเป็น อาจารย์ประจำหลักสูตรได้

2 ปรับคะแนนภาษาอังกฤษของอาจารย์ใหม่ให้เป็นไปตาม เกณฑ์ของสถาบัน

3 ปรับระบบจัดการศึกษาให้อิสระเพื่อสอดคล้อง กับการเรียนรู้ในยุคปัจจุบันที่มีการเรียนการสอน หลายรูปแบบ

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ประเด็นปรับเปลี่ยนเกณฑ์มาตรฐานในระดับบัณฑิตศึกษา ปริญญาโท

4 ปรับเปลี่ยนเพื่อให้สถาบันมีอิสระในการปรับรายวิชาและการทำ วิทยานิพนธ์เพื่อให้สอดคล้องกับความต้องการของตลาดและ หลักสูตรหลากหลายและข้ามศาสตร์ การศึกษาระดับปริญญาโท

5 เน้นให้นักศึกษาระดับปริญญาโทได้เรียนรู้การทำวิจัย เพื่อเป็นสาย วิชาการ หรือเป็น สายอาชีพ เพื่อการทำงานมากกว่าการเน้นเพื่อ การสร้างผลงานนวัตกรรมหรือผลงานวิจัย (ไม่เน้นผลงานตีพิมพ์)

6 ปรับเปลี่ยนให้สามารถใช้อาจารย์พิเศษ มาสอนได้เพื่อสร้าง ความร่วมมือกับหน่วยงานภายนอก และเอกชน ตลอดจน ถ่ายทอดองค์ความรู้จากประสบการณ์จริงแก่ นักศึกษา

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ประเด็นปรับเปลี่ยนเกณฑ์มาตรฐานในระดับบัณฑิตศึกษา ปริญญาโท

7 เพิ่มผู้ทรงคุณวุฒิที่ไม่ใช่อาจารย์แต่มีศักยภาพสูง เทียบเท่า อาจารย์มาเป็นอาจารย์ที่ปรึกษาร่วม

8 กรรมการสอบ ป โท. ปรับเพิ่มคุณภาพของ ผู้ทรงคุณวุฒิ ภายนอก โดยใช้ ผู้ทรงภายนอกจากฐานข้อมูล ของ กมอ

9 ปรับเกณฑ์การสำเร็จการศึกษาระดับปริญญาโท โดยใช้ ระบบ peer review จากภายนอกสถาบัน มาทดแทนการ ตีพิมพ์เผยแพร่
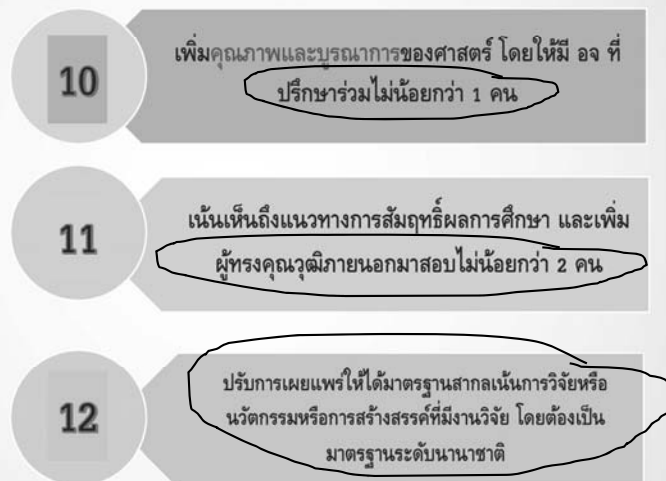
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ประเด็นปรับเปลี่ยนเกณฑ์มาตรฐานในระดับบัณฑิตศึกษา ปริญญาเอก

7

เน้นคุณภาพในระดับสากล และเพิ่มโจทย์ด้านนวัตกรรม และงานวิจัยเชิงสร้างสรรค์

10 เพิ่มคุณภาพและบูรณาการของศาสตร์ โดยให้มี อจ ที่ปรึกษาร่วมไม่น้อยกว่า 1 คน

11 เน้นเห็นถึงแนวทางการสัมฤทธิ์ผลการศึกษา และเพิ่มผู้ทรงคุณวุฒิภายนอกมาสอบไม่น้อยกว่า 2 คน

12 ปรับการเผยแพร่ให้ได้มาตรฐานสากลเน้นการวิจัยหรือนวัตกรรมหรือการสร้างสรรค์ที่มีงานวิจัย โดยต้องเป็นมาตรฐานระดับนานาชาติ

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ประเด็นอื่นที่เกี่ยวข้องกับคุณภาพหลักสูตร

8

- ปลดล็อค มคอ 3-7 ให้อิสระกับมหาวิทยาลัยในการดำเนินการ (2558)
- ยกเลิก มคอ. 1 เดิม ในสาขาวิชาชีพที่ไม่มีสภาวิชาชีพกำกับ โดยจะมีการดำเนินการจัดทำ มคอ. 1 ใหม่ที่เป็นกรอบมาตรฐานสะท้อนแก่นของศาสตร์หลัก (Degree Qualification Profile) เช่น B.A., B.Sc., B. FA. เป็นต้น
- ปรับ มคอ 2 (เปลี่ยนชื่อใหม่) ให้กระชับ และมีรายงานผลในตัวเอง
- การปรับปรุงกระบวนการรับทราบหลักสูตรออนไลน์ (CHECO)
- การประเมินแบบ Post-audit ระดับหลักสูตร
- การเทียบโอนประสบการณ์/หลักสูตร Non-Degree
- ระบบคลังหน่วยกิต (Credit Bank)

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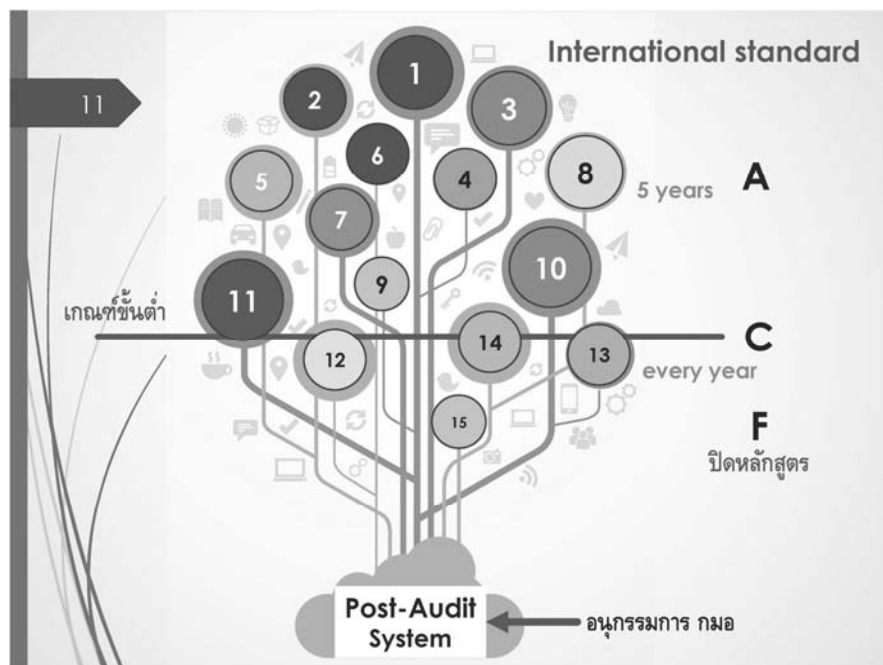
Why the shift to outcomes-based education?

International trends in education show a shift from the traditional 'teacher-centered' approach to a **'student-centered approach'**.

This approach is commonly referred to as **outcome-based approach**. The model focuses on what the students are expected to be able to do at the end of the module or programme.
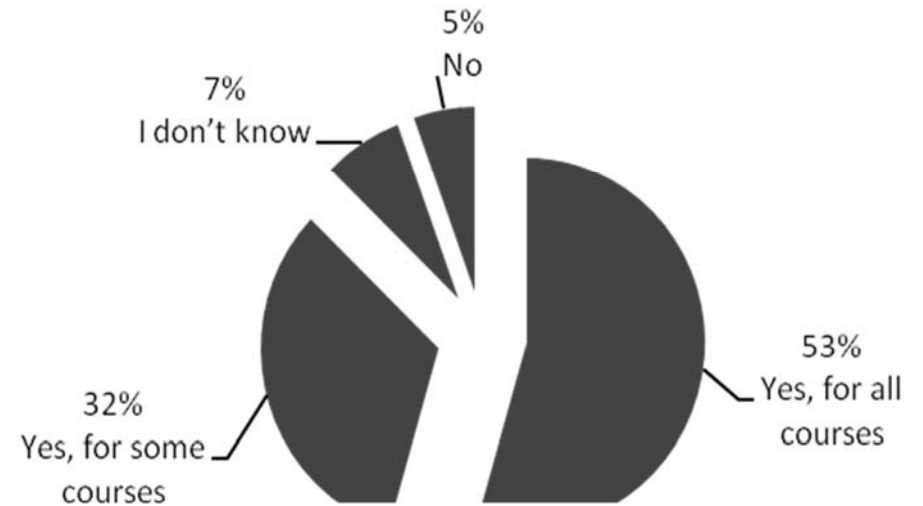
(Kennedy, D. 2007)

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Learning Outcomes at more than 80% Higher Education Institutions

- 5% No
- 7% I don't know
- 53% Yes, for all courses
- 32% Yes, for some courses

Reichert S: AAC&U Conference, Washington D.C., 2010

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What is outcome-based education?

Outcome-based education (OBE)

is a **learner-centered** learning philosophy that focuses on measuring **students' performance** (the intended learning outcomes). OBE itself is **not a teaching style** or method, it is a principle for **designing your teaching** in an effective way that enables learning happen and helps **students to achieve the intended learning outcomes**. Therefore, what matters most in OBE is **"what is learnt"** rather than **"what is taught"**.

http://celt.ust.hk/learner-centered-course-design

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OBE Model

"**Product (ELOs) defines process (SCL)**"

Harden RM, et.al. Med Teacher 21(1): 7–14, 1999

Expected Learning Outcomes (ELOs) is what the student should be able to know, understand and to do at the end of the programme.

SCL: "Student-Centered-Learning"

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Principles of OBE

- **Formulate the learning outcomes** (ELOs)
- **Backwards curriculum design** - design down (from the performances expected of graduates) and deliver up.
- **Create learning opportunities** (how to teach?) to help different learners achieve learning outcomes
- **Design student assessment** (how to assess?) to ensure that they are achieved all ELOs
- **Constructive alignment** (assessment – learning activities – learning outcomes)

26

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OBE Concept

Expected Learning Outcomes

Statements specifying what the learners will know and be able to do at the end of the programme.

Student-Centered Learning

Learning Activities

The teaching and learning methods which the teachers use to achieve each of the Learning Outcomes. Students will know exactly why they are being asked to engage in certain teaching and learning activities in their courses.

Assessments

An on-going process aims improving students' learning by measuring the learning outcomes they have achieved. Feedback will be given so that students know what they need to do in order to get better grades.
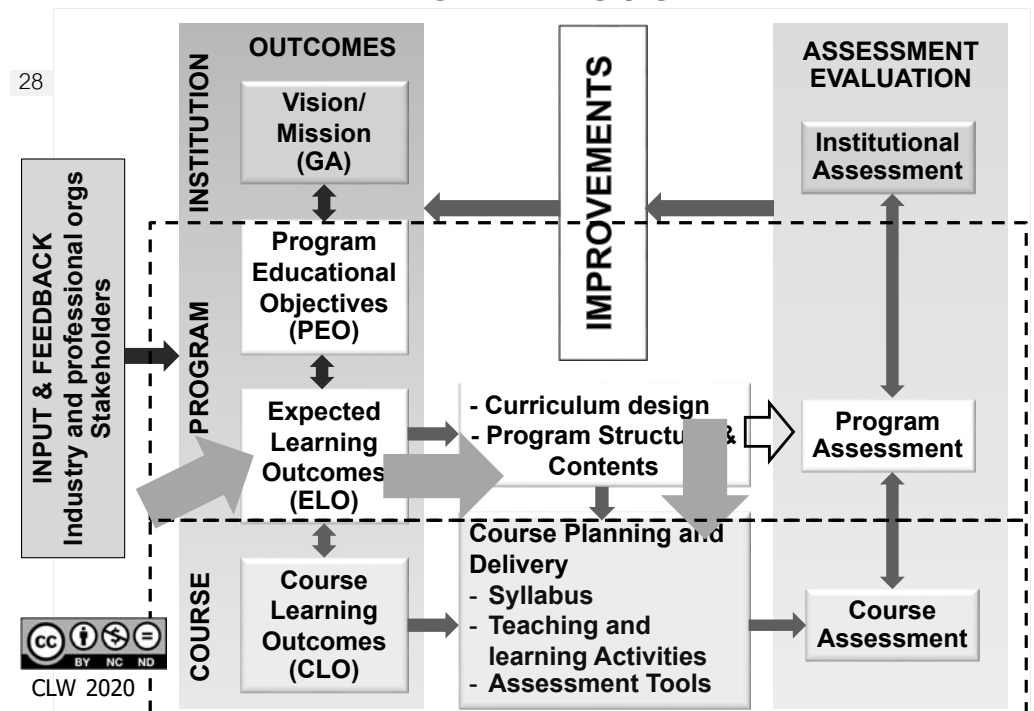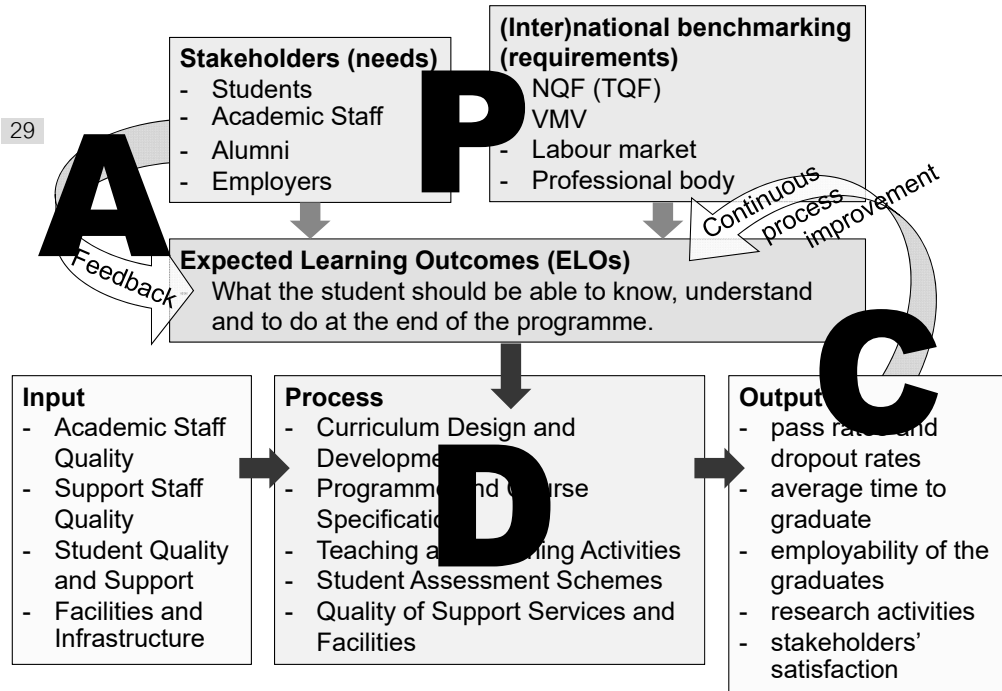
Constructive Alignment

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An OBE Model

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Slide 29

Stakeholders (needs)
- Students
- Academic Staff
- Alumni
- Employers

(Inter)national benchmarking (requirements)
- NQF (TQF)
- VMV
- Labour market
- Professional body

A **P** **C** **D**

Continuous process improvement

Feedback

Expected Learning Outcomes (ELOs)
What the student should be able to know, understand and to do at the end of the programme.

Input
- Academic Staff Quality
- Support Staff Quality
- Student Quality and Support
- Facilities and Infrastructure

Process
- Curriculum Design and Development
- Programme and Course Specification
- Teaching and Learning Activities
- Student Assessment Schemes
- Quality of Support Services and Facilities

Output
- pass rates and dropout rates
- average time to graduate
- employability of the graduates
- research activities
- stakeholders' satisfaction

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Slide 30

30

Stakeholders (needs)
- Students
- Academic Staff
- Alumni
- Employers   **10**

(Inter)national benchmarking (requirements)
- TQF   **10**
- VMV
- Labour market
- Professional body

10

Continuous process improvement   **10**

10 Feedback

Expected Learning Outcomes (ELOs)
What the student should be able to kr **1** understand and to do at the end of the programme.

Input   **6, 7, 8, 9**
- Academic Staff Quality
- Support Staff Quality
- Student Quality and Support
- Facilities and Infrastructure

Process   **2, 3, 4, 5**
- Curriculum Design and Development
- Programme and Course Specification
- Teaching and Learning Activities
- Student Assessment Schemes
- Quality of Support Services and Facilities
- Stakeholders' Feedback

Output   **10, 11**
- pass rates and dropout rates
- average time to graduate
- employability of the graduates
- research activities
- stakeholders' satisfaction

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Slide 31

AUN-QA Criteria at Programme Level, V3-2017

31

1. Expected Learning Outcomes
2. Programme Specification
3. Programme Structure and Content
4. Teaching and Learning Approach
5. Student Assessment
6. Academic Staff Quality
7. Support Staff Quality
8. Student Quality and Support
9. Facilities and Infrastructure
10. Quality Enhancement
11. Output

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Slide 32

5 steps in a curriculum design based on OBE

32

1. Clearly defining the **Expected Learning Outcomes**
2. **Backward Curriculum design** to align with ELOs
3. Construct **Program Structure and Content** that the sequence and integration are achieved.
4. Construct appropriate **Course Syllabus** that the alignment of CLOs with ELOs and constructive alignment of each course are achieved.
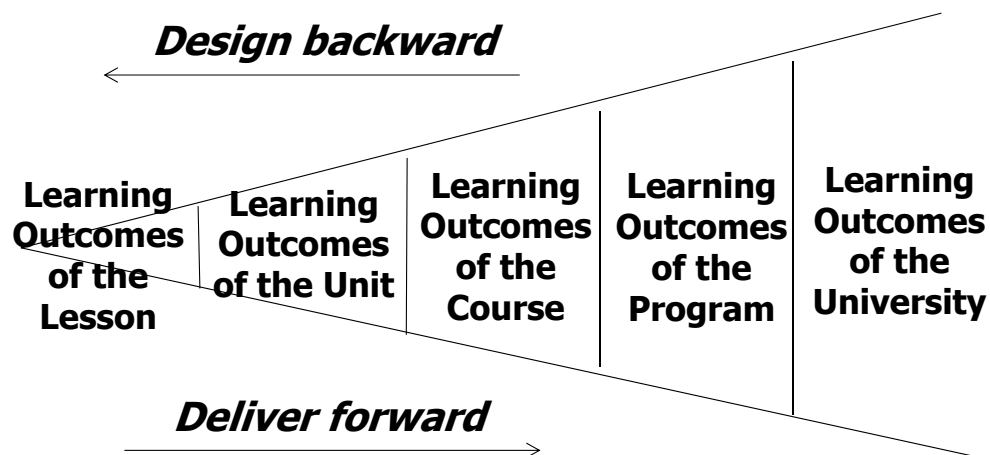5. Review **Constructive Alignment** to ensure the ELOs can be achieved

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How to formulate
Expected Learning Outcomes?

Others Name of Learning Outcomes

- At a **programme level**
  - Student Learning Outcomes, SLOs (USA)
  - Expected Learning Outcomes, ELOs (AUN)
  - Intended Learning Outcomes, ILOs
  - Programme Learning Outcomes, PLOs

- At a **course level**
  - Course Learning Outcomes, CLOs
  - Course Intended Learning Outcomes, CILOs

Designing and Delivering Learning Outcomes

Design backward

Learning Outcomes of the Lesson | Learning Outcomes of the Unit | Learning Outcomes of the Course | Learning Outcomes of the Program | Learning Outcomes of the University

Deliver forward

Thailand NQF, 2017......TQF - V2

- Align with AQRF
  (ASEAN Qualification Reference Framework)

- 3 Domains of Learning Outcomes
  - (1) **Knowledge**
  - (2) **Skills**
  - (3) **Application and Responsibility**

- 8 Educational Levels

Student Outcomes (ABET 2019-2020)

Student outcomes describe what **students are expected to know and be able to do** by the time of graduation. These relate to the **skills, knowledge,** and **behaviors** that students acquire as they progress through the program.

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Learning Outcomes (EQF 2008)

- Learning outcomes means statements of what a learner **knows**, **understands** and is **able to do** on completion of a learning process, which are **defined in terms of knowledge, skills and competence**.

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Categories of Learning Outcomes (AUN-QA)

- **Specific outcomes:**
  The outcomes that relate to the subject discipline and the knowledge, skills and/or competences particular to it.

- **Generic outcomes
  (sometimes called transferable skills)**
  The outcomes that relate to any and all disciplines e.g. written, oral, problem-solving, information technology, and team working skills, etc.

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3 Levels of Learning Outcomes

On successful completion of this programme (module, course, unit lesson), students will be able to ....
- Knowledge
- Skills
  - Specific skills
  - Soft skills (transferable skills)
- Competences (application)

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Learning Outcomes: Definition

EQF 2008

- **Knowledge** means the body of <u>facts, principles, theories and practices</u> that is related to a field of work or study.
- **Skills** means the **ability to apply knowledge** and use <u>know-how to complete tasks and solve problems</u>. Skills are described as <u>cognitive</u> (involving the use of logical, intuitive and creative thinking) or <u>practical</u> (involving manual dexterity and the use of methods, materials, tools and instruments).
- **Competence** means the proven **ability to use knowledge, skills** and personal, social and/or <u>methodological abilities</u>, in work or study situations and in professional and personal development.

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Levels of Learning (**student achievement**)

Competences
(Application and responsibility)

Skills
(specific and transferable skills)

Knowledge
(facts, principles, theories and practices)

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How to formulate the ELOs?

Benchmarks: National/International   **C1.1**

National Compliances: TQF, Professional Agency, …

Vision/Mission/Graduate Attributes

Requirements   Stakeholders   **C1.3**

Requirements

Program Educational Objectives

Expected Learning Outcomes   **C1.2**

MU 2020   CLW Copyright 2020

Exercise 1: Review your input information

- Your key stakeholders. What do they require?
- International benchmarking, e.g. labour market, ABET, international programme, ….. What do they require?
- What are the National Requirements, e.g. TQF, TABEE, What do they require?
- VM, GA of university, faculty, department

15 min

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Exercise 2: Programme Educational Objectives

> **Program educational objectives** are broad statements that describe what <u>graduates are expected to attain</u> within a few years after graduation. Program educational objectives are <u>based on the needs of the program's constituencies</u>.

Discuss among members of your group

Formulate <u>Programme Educational Objectives</u> (3-5 keys) that are align with VMV of SWU/FAC and also reflect the stakeholders' requirements.
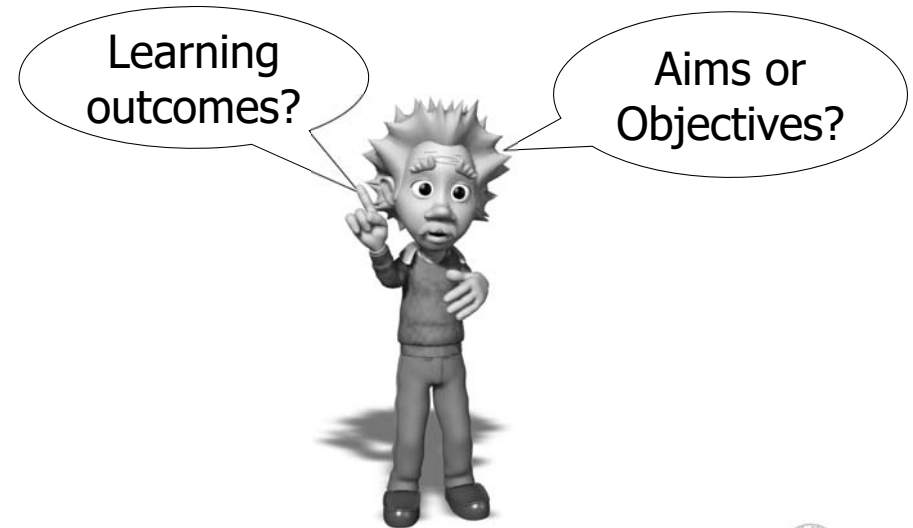
Time is Yours: …30 min

Aims (Goals), Objectives and LOs

Aims (Goals), Objectives and LOs

Aims (Goals) or objectives are more concerned with teaching, the <u>teacher's intentions</u> and the management of learning.

Learning outcomes are concerned with the <u>achievements or results of the learner</u> rather than the intentions of the teacher.

INTENTION — Goals / Objectives

RESULTS — Outcomes

Specificity
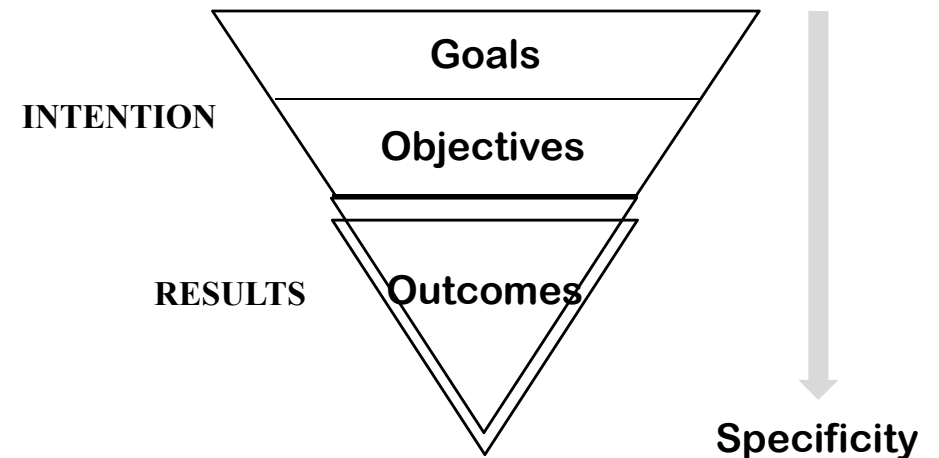
Exercise 3: Formulate ELOs

Discuss among members of your group

1) Formulate Expected Learning Outcomes (ELOs) of your programme.

2) Then review:
   - How the statement fulfill <u>SMART concept</u>?
   - How do they align with VMV of SWU/FAC?
   - How do they relate to PEOs?
   - How do they reflec<u>t</u> the stakeholders' requirements?

Time is Yours: …45.. min

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Easy Syntax….. ELO Statement

<u>Syntex</u>

(a) Action verb (Educational Taxonomy)
       + Objects + Modification (T&L/Assessment)

Graduates of our program shall have:

(a) an ability to **design + a system, component, or process + to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability**

CLV 2005

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ELOs for Postgraduate study

Degree (Research) or Degree (Professional)

2 components of ELOs
- Advance knowledge and skills
  → beyond Bachelor/Master degree
- Research competences
  → different level for Master/PhD

https://www.aqf.edu.au/sites/aqf/files/aqf-2nd-edition-january-2013.pdf

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Learning Outcomes of Masters Degree specified in AQF

AQF level 9 criteria	
Summary	Graduates at this level will have specialised knowledge and skills for research, and/or professional practice and/or further learning
Knowledge	Graduates at this level will have advanced and integrated understanding of a complex body of knowledge in one or more disciplines or areas of practice
Skills	Graduates at this level will have expert, specialised cognitive and technical skills in a body of knowledge or practice to independently: • analyse critically, reflect on and synthesise complex information, problems, concepts and theories • research and apply established theories to a body of knowledge or practice • interpret and transmit knowledge, skills and ideas to specialist and non-specialist audiences
Application of knowledge and skills	Graduates at this level will apply knowledge and skills to demonstrate autonomy, expert judgement, adaptability and responsibility as a practitioner or learner

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Learning Outcomes of Doctoral Degree specified in AQF

AQF level 10 criteria	
Summary	Graduates at this level will have systematic and critical understanding of a complex field of learning and specialised research skills for the advancement of learning and/or for professional practice
Knowledge	Graduates at this level will have systemic and critical understanding of a substantial and complex body of knowledge at the frontier of a discipline or area of professional practice
Skills	Graduates at this level will have expert, specialised cognitive, technical and research skills in a discipline area to independently and systematically: • engage in critical reflection, synthesis and evaluation • develop, adapt and implement research methodologies to extend and redefine existing knowledge or professional practice • disseminate and promote new insights to peers and the community • generate original knowledge and understanding to make a substantial contribution to a discipline or area of professional practice
Application of knowledge and skills	Graduates at this level will apply knowledge and skills to demonstrate autonomy, authoritative judgement, adaptability and responsibility as an expert and leading practitioner or scholar

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SMART

SMART helps to check an LO that required characteristics:
- **Specific**: accurately states what the successful student is expected to achieve
- **Measurable**: open to assessment which accurately assesses whether or not the outcome has been achieved
- **Achievable**: should be within the range of abilities of the student
- **Relevant**: should be relatable to the key objectives of the programme
- **Time scaled**: must be achievable within the duration of the study-programme

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How do I change my Programme or Course Objectives to Learning Outcomes?

The short answer is to complete one of the following statements:

- At the end of this course,
  students should be able to ....

- On successful completion of this course,
  students will be able to ....

By using such a stem, *the focus is turned to the student and what they will be able to do*.

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Civil Engineering, B.S.

1/3

http://www.csun.edu/engineering-computer-science/civil-engineering-construction-management/ce-program-mission

Program Mission
- To provide our students with a sound basic civil engineering education and to prepare them for entry into the professional practice of civil engineering, as well as to inculcate in them a recognition that civil engineering is a people serving profession. In keeping with these goals, we aim to develop in them an understanding that a successful professional career is one that addresses the needs of society and requires a lifetime of learning and leadership.

Program Educational Objectives
- To carry out the mission of the civil engineering program, the faculty have established the following educational objectives. During the first few years (1-5) following graduation, the graduates of the Civil Engineering program will have the following qualities:
- Graduates will accept increasing levels of responsibility over time and obtain their desired professional registration.
- Graduates will continue further studies in engineering and other professional disciplines as appropriate to their careers.
- Graduates will develop creative engineering solutions to project challenges that are cost effective and environmentally sensitive.

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Student Outcomes

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Graduates of our program shall have:

(a) an ability to apply knowledge of mathematics, science, and engineering;
(b) an ability to conduct laboratory experiments and to critically analyze and interpret data in more than one of the recognized major civil engineering areas;
(c) an ability to design a system, component, or process to meet desired needs within realistic constrains such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
(d) an ability to function on multidisciplinary teams;
(e) an ability to identify, formulate, and solve engineering problems;
(f) an understanding of professional and ethical responsibilities;
(g) an ability to communicate effectively;
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;

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Student Outcomes

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(i) a recognition of the need for, and an ability to engage in life-long learning;
(j) a knowledge of contemporary issues;
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;
(l) apply knowledge in a minimum of four (4) recognized major civil engineering areas;
(m) an ability to perform civil engineering design by means of design experiences integrated throughout the professional component of the curriculum; and
(n) an understanding of professional practice issues such as: procurement of work; bidding versus quality based selection processes; how the design professionals and the construction professions interact to construct a project; the importance of professional licensure and continuing education; and/or other professional practice issues.

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MPA: http://www.depaul.edu/university-catalog/degree-requirements/graduate/class/public-administration-mpa/Pages/learning-outcomes.aspx

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- **Clearly explain to stakeholders** key public issues both orally and in writing and detail their impact on the public at large.
- **Distinguish the interactive roles** that government organizations play in the business and non-profit sectors in planning and delivering public services.
- **Develop a research** question regarding a governmental issue, collect relevant data, and resolve the question.
- **Apply leadership** theories and techniques in managing and governing a public organization.
- **Use an ethical framework** to analyze an ethical dilemma within the political context of a government institution.

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Communication and Information Sciences
Ph.D. Program

60

(SLO1) Demonstrate understanding of research methods and subject knowledge in the field of Communication and Information Sciences

(SLO2) Synthesize diverse data, theories, and methods

(SLO3) Demonstrate the ability to conduct research

(SLO4) Propose and conduct original research

(SLO5) Develop and articulate a professional identity as a contributing member of a research community

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Recommended Verbs for Writing Learning Outcomes

COGNITIVE (K)

REMEMBER	UNDERSTAND	APPLY	ANALYZE	EVALUATE	CREATE
Retrieve knowledge from long-term memory	Construct meaning from instructional messages, including oral, written, graphic communication	Carry out/use procedure in a given situation	Break material into constituent parts; determine how parts relate to one another and to an overall structure or purpose	Make judgments based on criteria and standards	Put elements together to form coherent or functional whole; reorganize elements into a new pattern or structure
Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:
• Define • Describe • Label • List • Match • Recall • Recognize • State	• Classify • Compare • Discuss • Exemplify • Explain • Identify • Illustrate • Infer • Interpret • Predict • Report • Review • Summarize • Translate	• Apply • Change • Choose • Demonstrate • Execute • Implement • Prepare • Solve • Use	• Analyze • Attribute • Debate • Differentiate • Distinguish • Examine • Organize • Research	• Appraise • Check • Critique • Judge	• Compose • Construct • Create • Design • Develop • Formulate • Generate • Invent • Make • Organize • Plan • Produce • Propose

(Adapted from BCIT (2003) and PATE Module on Assessment and Evaluation)

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PSYCHOMOTOR (S)

PERCEIVE	SET	RESPOND AS GUIDED	ACT	RESPOND OVERTLY	ADAPT	ORGANIZE
Senses cues that guide motor activity	Is mentally, emotionally, physically ready to act	Imitates and practices skills	Performs acts with increasing efficiency, confidence, ad proficiency	Performs acts automatically	Adapts skill sets to solve a problem	Creates new patterns for specific situations
Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:

• Detect
• Differentiate
• Distinguish
• Identify
• Observe
• Recognize
• Relate
• Describe the perception
• Describe the sensation:
  o Hear
  o Listen
  o See
  o Smell
  o Taste
	• Assume a stance
	• Display
	• Perform motor skills
	• Position the body
	• Proceed
	• Show
		• Copy
		• Duplicate
		• Imitate
		• Operate under supervision
		• Practice
		• Repeat
		• Reproduce
			• Assemble
			• Calibrate
			• Complete with confidence
			• Conduct
			• Construct
			• Demonstrate
			• Dismantle
			• Fix
			• Execute
			• Improve efficiency
			• Make
			• Manipulate
			• Measure
			• Mend
			• Organize
			• Produce
				• Act habitually
				• Control
				• Direct
				• Guide
				• Manage
				• Perform
				
				Note: Same verbs as "ACT", but with modifiers describing the performance, e.g., faster, better, more accurate, outstanding, etc.
					• Adapt
					• Alter
					• Change
					• Rearrange
					• Reorganize
					• Revises
						• Arrange
						• Build
						• Compose
						• Construct
						• Create
						• Design
						• Originate
						• Make

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AFFECTIVE (A)

RECEIVE	RESPOND	VALUE	ORGANIZE	INTERNALIZE (CHARACTERIZE)
Selectively responds to stimuli	Responds to stimuli	Attaches value or worth to something	Conceptualizes value and resolves conflict between this value and other values	Integrate the value into a value system that controls behavior
Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:	Sample Verbs:
• Acknowledge • Choose • Demonstrate awareness • Demonstrate tolerance • Locate • Select	• Answer • Communicate • Comply • Contribute • Cooperate • Discuss • Participate willingly • Volunteer	• Adopt • Assume responsibility • Behave according to • Choose • Commit • Express • Initiate • Justify • Propose • Show concern • Use resources to	• Adapt • Adjust • Arrange • Balance • Classify • Conceptualize • Formulate • Organize • Prepare • Rank • Theorize	• Act upon • Advocate • Defend • Exemplify • Influence • Perform • Practice • Serve • Support

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How to formulate the ELOs?

Benchmarks: National/International **C1.1**

National Compliances: TQF, Professional Agency, …

Vision/Mission/Graduate Attributes

Requirements ↓ **Stakeholders** **C1.3** ↓ *Requirements*

Program Educational Objectives

↓

Expected Learning Outcomes **C1.2**

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Slide 65

Levels of Learning
(student achievement)

65

Competences
(Application and responsibility)

⬆

Skills
(specific and transferable skills)

⬆

Knowledge
(facts, principles, theories and practices)

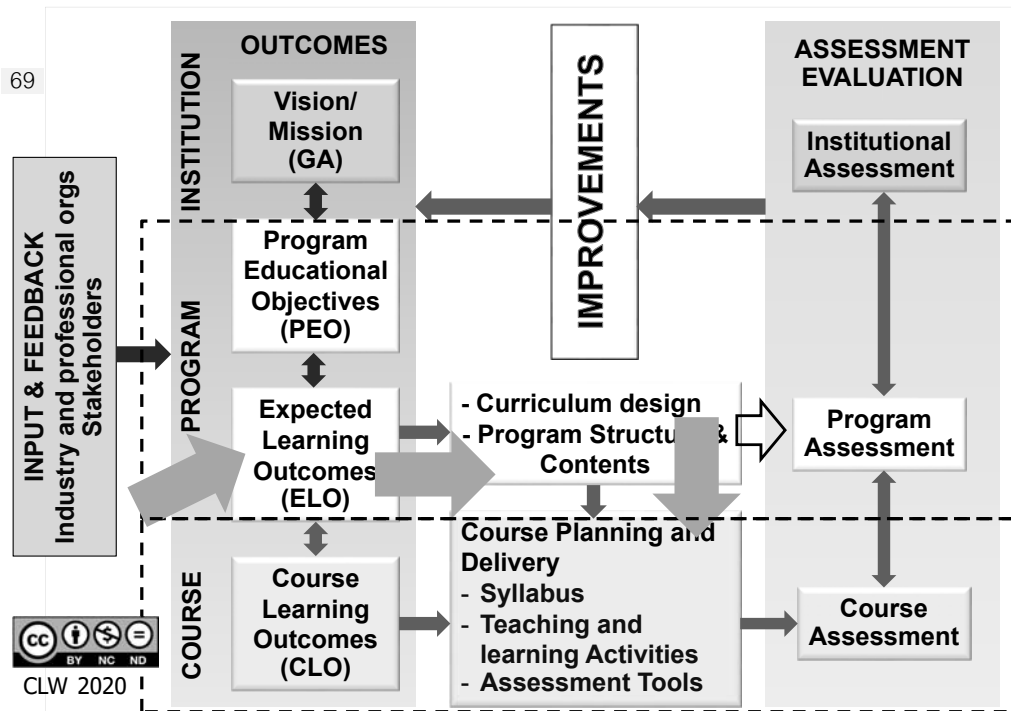MAHIDOL UNIVERSITY

Slide 66

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Your Time is Now...

Slide 67

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Curriculum Design

Using Backward Technique

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Slide 68

5 steps in a curriculum design based on OBE

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1. Clearly defining the **Expected Learning Outcomes**
2. **Backward Curriculum design to align with ELOs**
3. **Construct Program Structure and Content that the sequence and integration are achieved.**
4. Construct appropriate **Course Syllabus** that the alignment of CLOs with ELOs and constructive alignment of each course are achieved.
5. Review **Constructive Alignment** to ensure the ELOs can be achieved

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An OBE Model

OUTCOMES | IMPROVEMENTS | ASSESSMENT EVALUATION

INSTITUTION
- Vision/Mission (GA)
- Institutional Assessment

INPUT & FEEDBACK Industry and professional orgs Stakeholders

PROGRAM
- Program Educational Objectives (PEO)
- Expected Learning Outcomes (ELO)
- Curriculum design
- Program Structure & Contents
- Program Assessment

COURSE
- Course Learning Outcomes (CLO)
- Course Planning and Delivery
  - Syllabus
  - Teaching and learning Activities
  - Assessment Tools
- Course Assessment

CLW 2020

Benchmarks: National/International **C1.1**
National Compliances: TQF, Professional Agency, …
Vision/Mission/Graduate Attributes
Requirements → Stakeholders **C1.3** Requirements
Program Educational Objectives
Expected Learning Outcomes **C1.2**

Expected Learning Outcomes

Backward Technique

C3.3 — **Curriculum Design/Development** curriculum is logically structured, sequenced, integrated and up-to-date.

C3.1 C3.2 — **Program Structure:** study plan, course content, major, senior project, internship
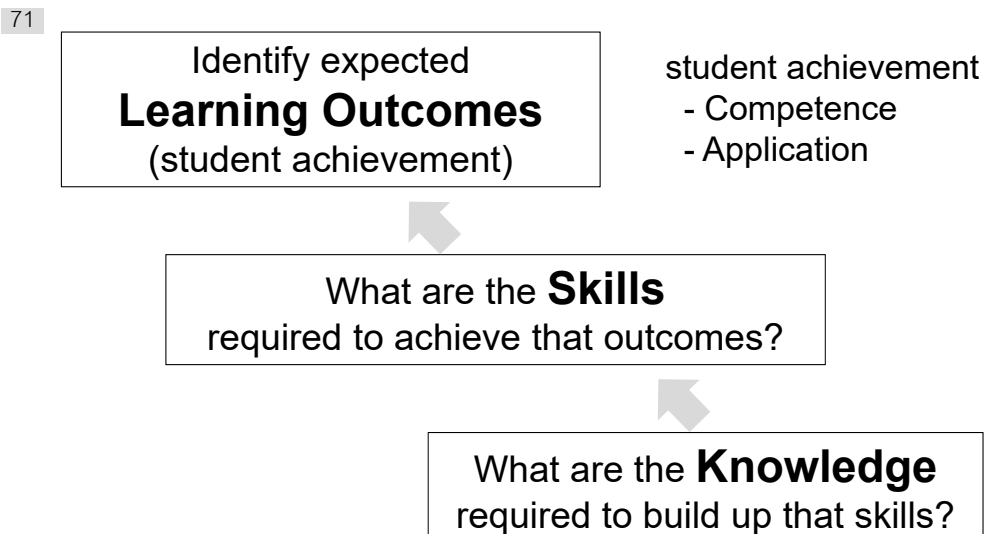**Curriculum Map**

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Backward Design Process

Identify expected
Learning Outcomes
(student achievement)

student achievement
- Competence
- Application

What are the **Skills** required to achieve that outcomes?

What are the **Knowledge** required to build up that skills?

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Backward from each ELO

ELO/ Competency	Specific Skills	Generic Skills	Knowledge
ELO 1	SS1	GS1 GS2	K1 K2 K3
	SS2	GS1	K2 K4
	SS3	GS1 GS3	K1 K2 K5
ELO 2	SS3	GS3 GS4	K1 K2 K3

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Transform BCD to Courses, Modules, Activities

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> From **BCD** of all ELOs, you can combine
>   KNOWLEDGES and SKILLS to COURSES

For **example: From ELO3,**

Course C1 = K1 + K2 + K3

Course C2 = SS1 + GS1

Course C3 = K4 + SS2 + GS2

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ELO4: Perform imaging of CT-brain in emergency

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Specific Skills	Soft-Skills (Transferable skills)	Knowledge
1. Patient approach	Communication, Cultural awareness, Professional ethics	Declaration of Patient's rights, Request, patient information
2. Patient preparation and positioning	Communication, Cultural awareness, Professional ethics	CT technology, Anatomy
3. Handing of CT and instrumentation concerned	Decision making, Problem solving	CT technology, CT-Physics, PACS,
4. Exposure techniques	Decision making, Professional ethics	CT technology, CT-Physics, Anatomy
5. Radiation protection	Decision making, Problem solving	CT technology, CT-Physics, Biological effect, Anatomy
6. Quality control		CT technology, QC instrument
7. Image interpretation		CT technology, Image quality, Cross-sectional anatomy, Radiation pathology
8. Patient care	Communication, Problem solving, Professional ethics	HPC, CPR
9. Clinical correlation	Working with the other	Clinical Labs, Pathology, Diseases

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ELO4: Perform imaging of CT-brain in emergency

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Specific Skills	Soft-Skills (Transferable skills)	Knowledge
1. Patient approach	Communication; Cultural awareness; Professional ethics	Patient information; Declaration of Patient's rights; Request
2. Patient preparation and positioning	Communication; Cultural awareness; Professional ethics	Anatomy; CT technology
3. Handing of CT and instrumentation concerned	Decision making; Problem solving	PACS; CT technology; CT- Physics
4. Exposure techniques	Decision making; Professional ethics	Anatomy; CT technology; CT- Physics

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Course mapping

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	ELO 1	ELO 2	ELO 3	ELO 4	ELO 5	ELO 6	ELO 7	ELO 8
Y1	GE		CT- Physics 4		Anatomy 5			
Y2		Professional ethics 5	Communication 5					
Y3		Cultural awareness 4	Declaration of Patient's rights 1		PACS 2	Request 1	Problem solving 5	
Y4		Decision making 4		CT technology 2	Patient information 1			

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Study plan

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8

GE

Communication 5

Professional ethics 5

Problem solving 5

Cultural awareness 4

Decision making 4

Anatomy 5

CT- Physics 4

CT technology 2

PACS 2

Request 1

Declaration of Patient's rights 1

Patient information 1

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From the backward curriculum design …

You can combine the related Knowledge, Skill, and Competence into ….

- Courses (subjects),
- Units,
- Modules, or
- Activities
- Sequencing the courses, units, modules and activities to make a study plan

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BS – Conservation Biology

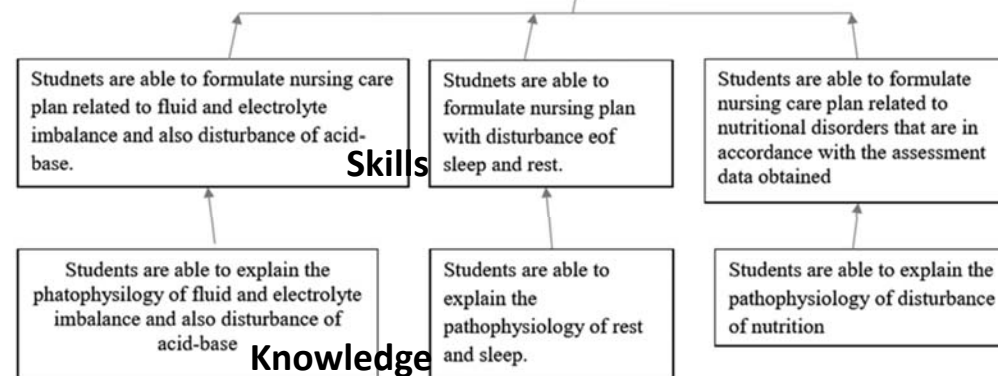| ELO-04	Skills		Knowledge
	specific	generic	
Use the processes and methods of scientific inquiry, computer literacy, numerical and statistical skills to answer the research questions related to biodiversity conservation.	Demonstrate scientific inquiry, computer literacy, numerical and statistical skills related to biodiversity conservation	(G1) Scientific inquiry ¶ (G2) Information management ¶ (G4) Numerical and statistical skills	(K8) Population biology (K10) Ecology (K12) Conservation biology (K13) Environmental science (K16) Geographic information system (K19) Research methodology (K26) Statistical analysis (K27) Information management and computer application
	Solve problems by using the scientific inquiry, computer literacy, numerical and statistical skills	(G1) Scientific inquiry ¶ (G2) Information management ¶ (G4) Numerical and statistical skills ¶ (G5) Decision making ¶ (G6) Communication skills ¶ (G9) Critical thinking ¶ (G10) Holistic view ¶ (G11) Problem solving	(K8) Population biology (K10) Ecology (K12) Conservation biology (K13) Environmental science (K16) Geographic information system (K19) Research methodology (K26) Statistical analysis (K27) Information management and computer application
			computer application

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Nursing Programme

CLO Students are expected to be able to formulate nursing diagnosis in a case of patient with disturbance of fluid, nutrition and sleep and rest accordance with the related concept or theories.

Studnets are able to formulate nursing care plan related to fluid and electrolyte imbalance and also disturbance of acid-base.

Studnets are able to formulate nursing plan with disturbance eof sleep and rest.

Students are able to formulate nursing care plan related to nutritional disorders that are in accordance with the assessment data obtained

Skills

Students are able to explain the phatophysiology of fluid and electrolyte imbalance and also disturbance of acid-base

Students are able to explain the pathophysiology of rest and sleep.

Students are able to explain the pathophysiology of disturbance of nutrition

Knowledge

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Exercise 4: Backward curriculum design

Procedures:

1. From each ELO/Competence, determine the skills and knowledge need to achieve that ELO.

2. From each specific and/or generic skills, determine the sequence of courses need to achieve that ELO (**curriculum map**).

3. Design **programme structure**.

4. Design **study plan**.

Time is yours: … 90… min

Programme structure

GE	Entrance Assessment
Core Courses	Qualifying Program
Specialise Courses	Core Courses
Electives	Thesis, Thematic Paper, Dissertation
Senior project	Internship, Fieldwork, Electives
Internship	Exit Assessment
Exit Assessment	

Programme structure of DVM

Slide 85

Curriculum Structure of BSP

Slide 86

Slide 87
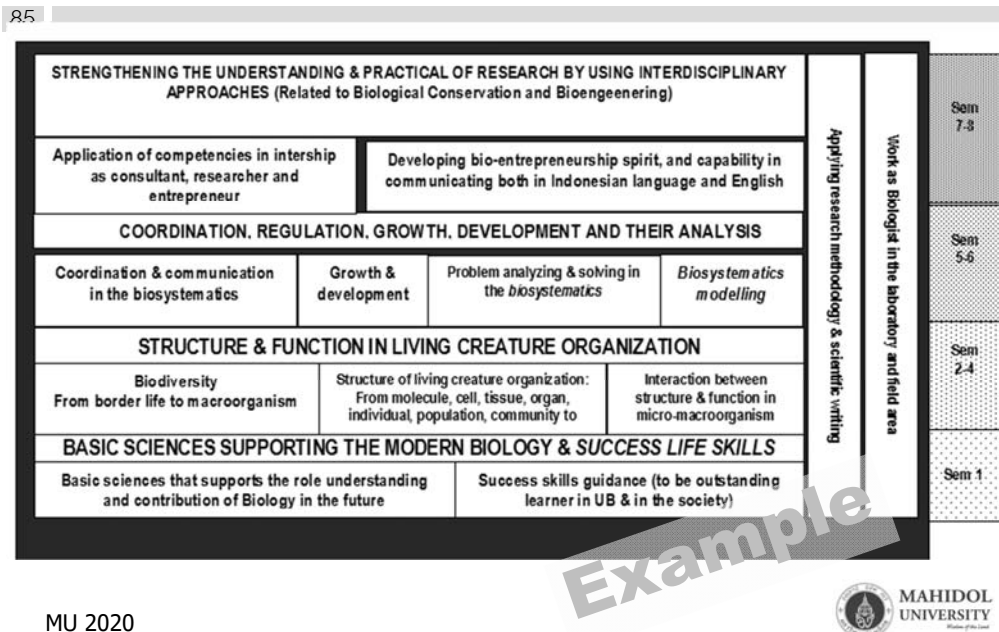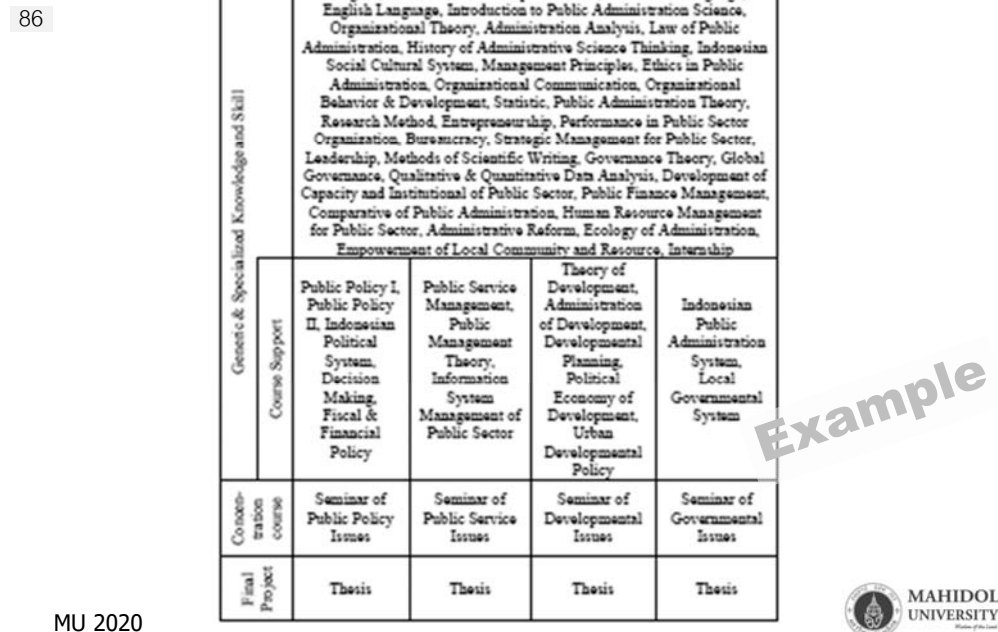
Programme Structure
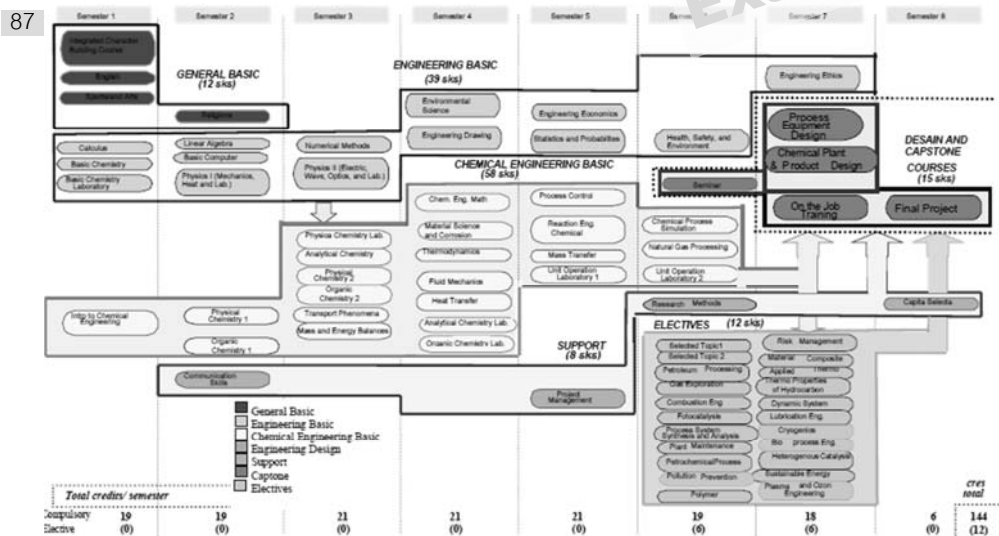
Figure 2.2 Curriculum Structure of ChESP
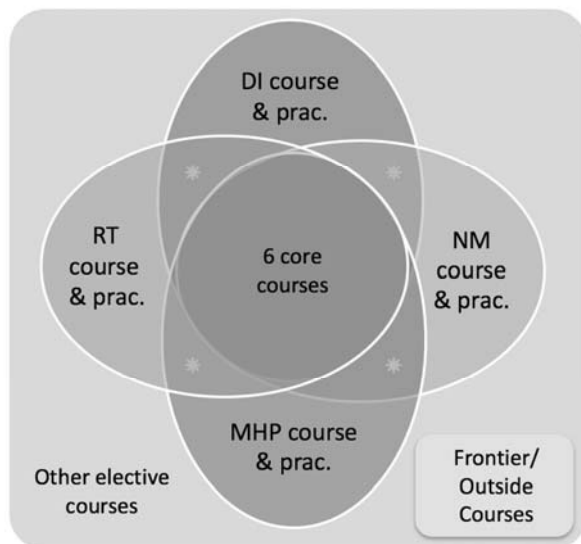
Source: Chemical Engineering, Universitas Indonesia

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Home » Education
MD Programme

Curriculum at a Glance

Medical Physics Program Curriculum

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*1 minor track courses for PhD (optional for MS)

CLW 2020   https://medicalphysics.duke.edu/programs

Curriculum Mapping of Courses and ELOs

	CODE	NAME OF COURSE	CREDITS	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9
Specialized skills (specialized courses)												
1		Subject 1	3	X			X					
2		Subject 2	3	X			X		X			
3		Subject 3	3	X		X	X			X		
4		Subject 4	3	X			X	X			X	X
5		Subject 5	3	X			X	X			X	
6		Subject 6	3	X			X	X	X		X	
7		Subject 7	3	X							X	
8		Subject 8	3	X	X		X	X	X		X	X

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Curriculum matrix, example 1

Table 1.2 Relationship between Courses and Expected Learning Outcomes (Continued)

Source: Chemical Engineering, Universitas Indonesia

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QA at Programme Level

Legend: L–learned in the course; P–practiced in the course; O–not yet learned/practiced but the opportunity to exists)

MU 2020   *CHED Handbook on Typology, OBE, and ISA, 2014*

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Ph.D. – Economic Programme

PhD Program Requirements	ELO1	ELO2	ELO3	ELO4	ELO5	ELO6	ELO7
Core Courses	I, R	I	I	I	I		
Qualifying Exams	R	R					I, A
Field Courses	R	R	I, R	I, R	I, R	I, R	
Research Seminar	R	R	R	I, R	R	R	R, A
Electives	R	R	R	R	R	R	
Proposal Defense	R, A	R, A	R, A	R, A	R	R	R
Thesis Defense	M, A	M, A	M, A	M, A	M	M	R
Thesis Submission	M	M	M	M	M	M	A

I = Introduced; R = Reinforced & opportunity to practice; M = Mastery at the senior or exit level;
A = Assessment evidence collected

1. Demonstrate an understanding of economic theory and analytical and quantitative tools.
2. Demonstrate an ability to understand, integrate, and apply the various tools, concepts, and principles of economics and quantitative methods to analyze and to develop solutions to economic problems in a clear and concise written form.
3. Demonstrate a "frontier" level competency and familiarity with the literature in the student's perceived specialty area.
4. Demonstrate the ability to conduct independent and original research in economics.
5. Have the skills necessary to qualify for teaching positions at the university and college levels, and for research positions in the public or private sector.
6. Program graduates will be able to obtain employment that uses the level of expertise obtained in the Ph.D. program.
7. Complete these goals according to the timeline described in the graduate program guidelines.

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Ph.D. - Communication and Information Sciences program

Key: I=Introduced, R=Reinforced, M=Mastered, A=Assessed

Program Element	SLO1	SLO2	SLO3	SLO4	SLO5
CIS 701: Communication/Information Theories	IRA	IRA			IR
CIS 702: Communication/Information Technologies	IRA	IRA			IR
CIS 703: Communication/Information Research Methods	IRA	IRA	IRA	IR	IR
CIS 704: Special Topics in CIS	IRA	IRA			IR
CIS 720: Interdisciplinary Seminar in CIS	IR	IR	IR	IR	IRM
Research methods course outside CIS	IRMA	IR	IR	IR	
Coursework to prepare for secondary exams	IRMA				
Coursework to prepare for primary exam	IRMA	IRMA			
Secondary Exams (2)	A	A			
Primary Exam	A	A	A		A
Faculty Mentoring Program			IR	IR	RM
CIS 699 Directed Research	RM	RM	RM	RM	RM
Research Publication Requirement			MA	IRA	MA
Dissertation Proposal (including defense)			RMA	IRA	MA
Dissertation (including defense)			MA	IRMA	MA

(SLO1) Demonstrate understanding of research methods and subject knowledge in the field of Communication and Information Sciences
(SLO2) Synthesize diverse data, theories, and methods
(SLO3) Demonstrate the ability to conduct research
(SLO4) Propose and conduct original research
(SLO5) Develop and articulate a professional identity as a contributing member of a research community

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Development of Course Syllabus

(Couse specification)

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5 steps in a curriculum design based on OBE

1. Clearly defining the **Expected Learning Outcomes**
2. **Backward Curriculum design** to align with ELOs
3. Construct **Program Structure and Content** that the sequence and integration are achieved.
4. **Construct appropriate Course Syllabus that the alignment of CLOs with ELOs and constructive alignment of each course are achieved.**
5. Review **Constructive Alignment** to ensure the ELOs can be achieved

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Slide 97

Benchmarks: National/International **C1.1**
National Compliances: TQF, Professional Agency, ...
Vision/Mission/Graduate Attributes
Requirements → Stakeholders **C1.3** ← Requirements
Program Educational Objectives
Expected Learning Outcomes **C1.2**
Backward Technique
C3.3 Curriculum Design/Development — curriculum is logically structured, sequenced, integrated and up-to-date.
C3.1 C3.2 Program Structure: study plan, course content, major, senior project, internship — Curriculum Map/Course Outlines/TQF3,4

Curriculum Map

COURSES	ELO1	ELO2	ELO3	ELO4	ELO5
GE Courses					
Core Courses					
MU 301	R/A			I/R	
MU 302		R/A	R		R
MU 320	R		R/A		R
Specialize Courses					
MU 421	M/A			R/M	
MU 441		M/A	M/A		M/A
MU 495	M/A	M/A	M/A	M	M/A
Senior Project		M/A			M/A

Expected Learning Outcomes
↓
Curriculum Design/Development
↓
Course Design
Course Specification/Course Syllabus/
↓
Course Learning Outcomes
Constructive alignment
Learning Activities ←→ **Assessments**

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Curriculum Map: Course matrix

COURSES	ELO1	ELO2	ELO3	ELO4	ELO5
Core Courses					
MU 501	K5/SS1			GS1	
MU 502		K6/SS2	K6/SS4		GS2
▶ MU 520	K7/SS3		K8/SS5		GS2
Specialize Courses					
MU 621	SS6			GS1	
MU 641		SS7	SS8		GS2
MU 695	SS9	SS10	SS11/A	GS3	GS4
THESIS	SS1-11			GS1-4	

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MU 520 = (K7 + SS3) + (K8 + SS5) + GS2

CLOs should be developed from CM and BCD

K/S	Course Learning Outcome (CLO)	ELO
K7	Action verb + Object + modification	1
K8	Action verb + Object + modification	3
SS3 + GS2	Action verb + Object + modification	1,5
SS5 + GS2	Action verb + Object + modification	3,5

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Course Syllabus

MU 520: (K7 + SS3) + (K8 + SS5) + GS2

CLO 1: .... (ELO ....)
CLO 2: Action Verb + Object + Modification (ELO ....)
CLO 3 .... (ELO ....)
CLO 4 .... (ELO ....)

	Content	CLO No.	T/L Approach	Assessment Scheme
1				
2				
3				

Assessment of CLOs ....

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Design a Course Syllabi

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Exercise 5: Design a course syllabi

Procedures:

1. Select a course (subject) in the curriculum map
2. Using the relationship of the course in curriculum map and BCD with ELO to construct CLOs.
3. Please aware of sequence and integration of student learning

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Homework

1: Expected Learning Outcomes
2: Backward curriculum design
3: Programme structure, study plan
4. Curriculum mapping (constructive alignment)
5: Course Syllabus

Development plan…….
Implementation……
When?

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Thank You

… for joining us.