

KMUTT Curriculum Design

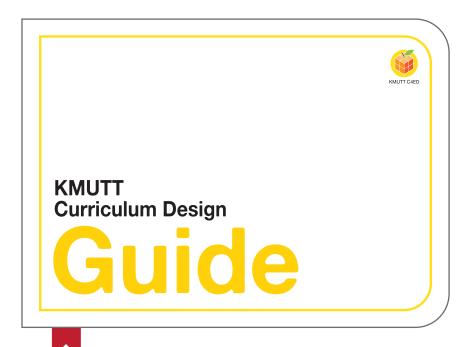
This book is for KMUTT's internal use only

Version 1.0, Date 1 September 2016

Before you start

This book is developed for KMUTT internal use only

About this book



• Outcome Based Education, OBE for short, has gained footholds in revitalizing the education system effectiveness in many countries such as Canada, the USA, Australia, Hong Kong, and New Zealand. OBE simply relies on the redesign of the curriculum (or programs) to ensure the desired outcome. The so called "Backward Design" principles, thus, comes into play.

• In an effort to facilitate the implementation of OBE at KMUTT, C4ED has issued this "KMUTT Curriculum Design Guide" as a primer for all academic staffs with roles and responsibilities in OBE approached Curriculum Design. Still this guide book should not be mistaken for an official reference as it still continues to evolve with KMUTT's adoption of OBE towards our own version of OBE -- KMUTT 3.0 (The concept initiated by Associate Professor Dr.Bundit Thipakorn – then KMUTT's VP-Educational Development)

Notes

- o As this book is a compendium of curriculum designs from various sources, it is for KMUTT internal use only.
- o The words in the following pairs are used interchangeably unless otherwise specified.
- Curriculum and Program
- Skill and Competence

The structure of this book

All 7 Chapters of this book are organized as followings:

Chapter 0: Introduction-OBE

Outcome Based Education is explained as an integral part of Student Centered learning.

Chapter 1: Situation Analysis

To identify External and Internal factors that could contribute to the impact of the curriculum design and Analyze the existing and additional resources, and requirements of all stake holders.

Chapter 2: Program Concept

To frame the expectations of what graduates would perform with a desired set of competencies and knowledge after graduation, all based on the analysis in Chapter 1 and on added unique identity of the curriculum. Then to figure out how to attain those expectations.

Chapter 3: Objectives and Outcomes

To differentiate Objectives from Outcomes of the curriculum, to understand the concept of deriving the Curriculum Outcomes, and to write them with some examples.

Chapter 4: Structure and Sequence

To structure the Curriculum and sequence its learning development in its study plan towards the end that students would attain the Curriculum Outcomes.

Chapter 5: Constructive Alignment

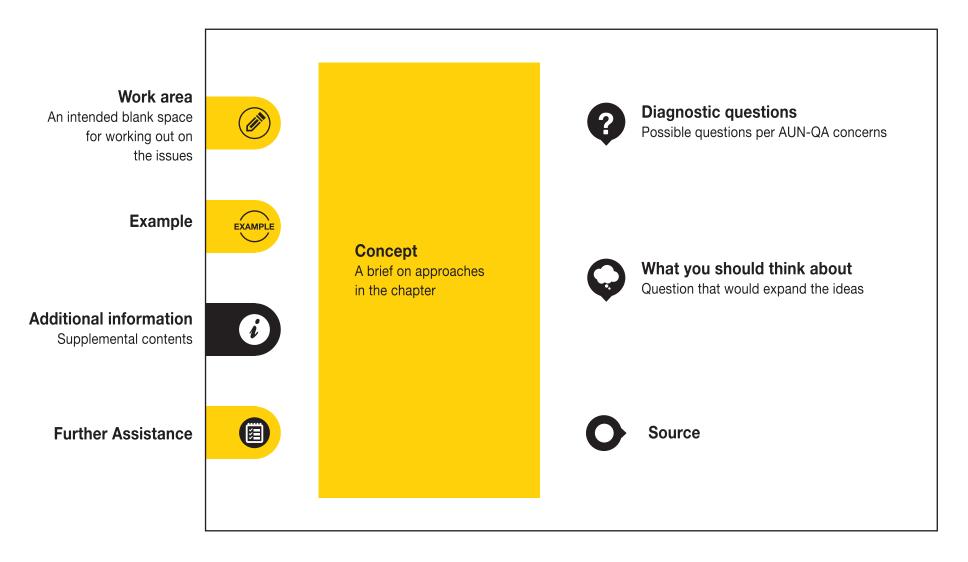
To understand "Constructive Alignment" curriculum design concept through example(s) of how to measure(?), and assess the Learning Outcomes, and how to manage the TEACHING and LEARNING so the students would attain the desired Learning Outcomes.

Chapter 6: Program Specification

How to write up the "Program Specification".

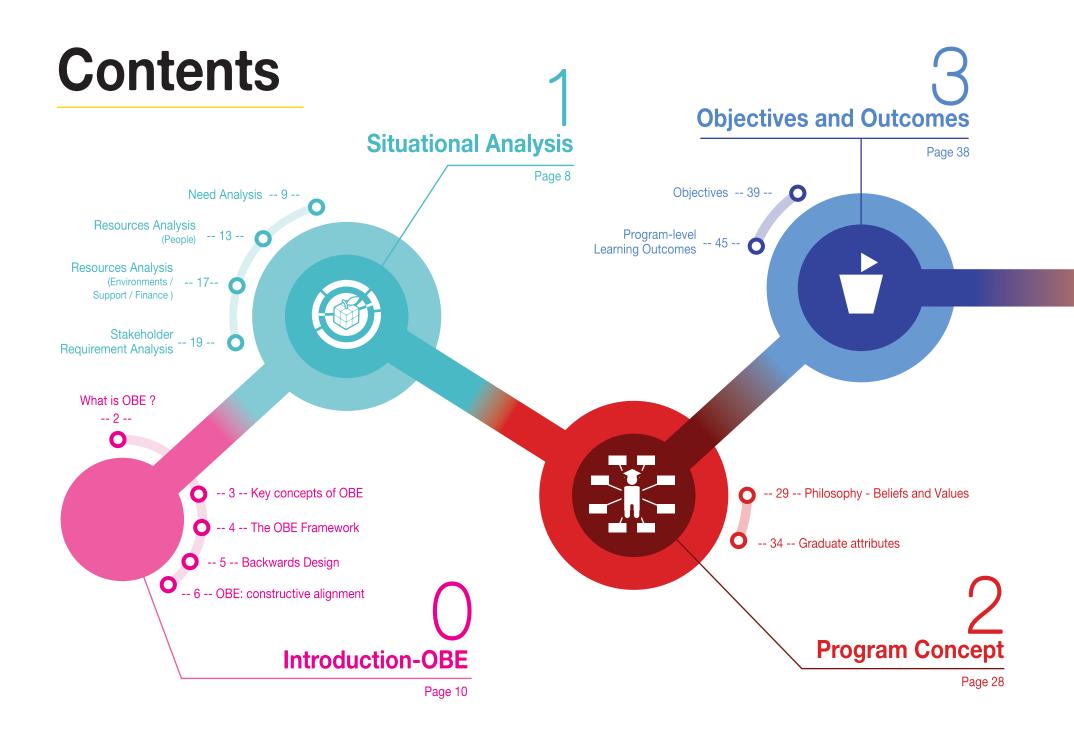
How a chapter is structured

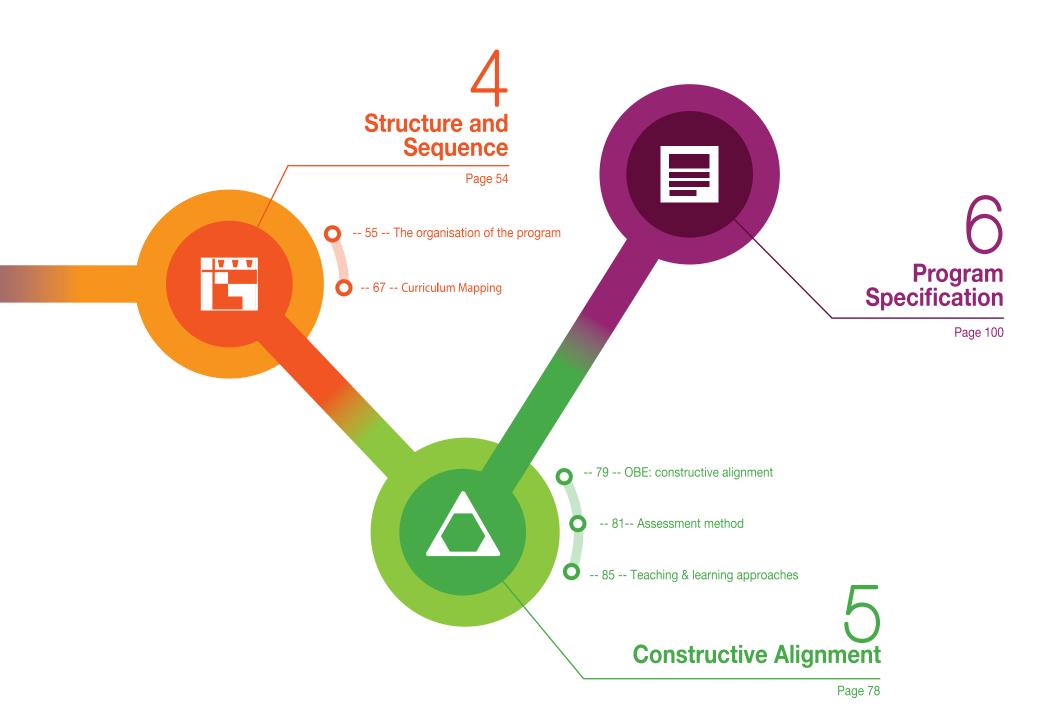
Each chapter is organized by topics as follows:

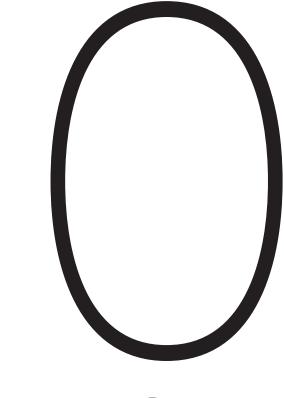


List of Abbreviations

OBE	Outcome-Based Education	LO	Learning outcome
	(การศึกษาแบบเน้นผลลัพธ์การเรียนรู้ของผู้เรียนเป็นหลัก)		(ผลลัพธ์การเรียนรู้)
EdPEx	Education Criteria for Performance Excellence	ELO	Expected Learning Outcomes
	(เกณฑ์คุณภาพการศึกษาเพื่อการดำเนินการที่เป็นเลิศ)		(ผลลัพธ์การเรียนรู้ที่คาดหวัง)
AUN	ASEAN University Network	SO	Student Outcome
			(ผลลัพธ์การเรียนรู้ของผู้เรียน)
AUN-QA	ASEAN University Network Quality Assurance	PLO	Program-level Learning Outcome
ABET	Accreditation Board for Engineering and Technology	PLO	(ผลลัพธ์การเรียนรู้ระดับหลักสูตร)
	reoreatation board for Engineering and reormology		(และสาราคายออนจูย-พอกสกลูพอ)
AACSB	Association to Advance Collegiate Schools of Business	Sub-PLO	Sub-Program-level Learning Outcome
			(องค์ประกอบย่อยของผลลัพธ์การเรียนรู้ระดับหลักสูตร)
CUPT	The Council of the University Presidents of Thailand		
	(ที่ประชุมอธิการบดีแห่งประเทศไทย)	CLO	Course Learning Outcome
			(ผลลัพธ์การเรียนรู้ระดับรายวิชา)
CUPT QA	The Council of the University Presidents of Thailand		
	Quality Assurance	PEO	Program Educational Objective
TQF	Thai Qualifications Framework for Higher Education	704	Theiland Quality Award
IQF	(กรอบมาตรฐานคุณวุฒิระดับอุดมศึกษาแห่งชาติ)	TQA	Thailand Quality Award
	(กรออก พรฐานที่เสรี่พระพออี่พรกกอ แกง พ)	IQA	Internal Quality Assurance
KMUTT QF	KMUTT Qualifications Framework	i ser i	
	(กรอบคุณลักษณะบัณฑิตที่พึงประสงค์ของ มจธ.)	EQA	External Quality Assurance
			-
EGA	Expected Graduate Attributes	SAR	Self Assessment Report
	(คุณลักษณะของบัณฑิตที่พึงประสงค์)		







Introduction-OBE

What is OBE ?

Outcome-based education (OBE) is a learner-centered learning philosophy that focuses on measuring students' performance (the 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".*

Key concepts of OBE

An OBE curriculum means starting with a clear picture of what is important for students to be able to do, then organizing the curriculum, instruction and assessment to make sure this learning ultimately happens. The key concepts are:

Clarity of focus - This means that everything teachers do must be clearly focused on what they want students to know, understand and be able to do. In other words, teachers should focus on helping students to develop the knowledge, skills and personalities that will enable them to achieve the intended outcomes that have been clearly articulated.

Backwards curriculum design - as the starting point define clearly what students should be able to do on completing their course of study. Once this has been done, all instructional decisions are then made to ensure achieve this desired end result

Create learning opportunities - Teachers must strive to provide expanded opportunities for all students. This principle is based on the idea that not all learners can learn the same thing in the same way and in the same time. However, most students can achieve high standards if they are given appropriate opportunities.

Constructive alignment - design the curriculum, teaching, learning and assessment to enable students to achieve the intended learning outcomes.

Outcomes assessment and continuous improvement - collect data on students' achievement of learning outcomes and use outcome assessment data to inform further development and enhancement of the program/-subject.

The "Essence" of OBE

- In OBE, what matters ultimately is not what is taught, but what is learned;
- Teachers must set appropriate course intended learning outcomes, instead of teaching objectives;
- Constructive alignment: What we teach, how we teach and how we assess ought to bealigned with the intended learning outcomes, such that they are fully consistent with each other;
- The quality of teaching is to be judged by the quality of learning that takes place;
- All OBE approaches take a criterion-based view of assessment and focus on what students can do with knowledge after a period of learning.

Source:

- http://celt.ust.hk/learner-centered-course-design
- OBE Principles and process. Center for Education Innovation. Hong Kong University of Science and Technology available at http://cei.ust.hk/teaching-resources/outcome-based-education/institutional-resources/obe-principles-and-process.
- Guide to OBE. The Hong Kong Polytechnic University, available at https://www.polyu.edu.hk/obe/07_1_What_is_OBE.php
- Outcome-Based Learning Project. The Education University of Hong Kong, available at https://www.ied.edu.hk/flanobl/view.php?secid=784

The OBE Framework

The OBE approach is a continuous process of education wherein the curriculum, teaching and learning strategies, and assessment tools are improved continuously. The OBE learning process can be stated into four steps:

(a) Plan (Syllabus Writing/Review) – The Course Learning Outcomes are aligned with the KMUTT QF, Program objectives and Program-level Learning Outcomes (PLOs). The syllabi reflect strategies (learning plan) for achieving the outcomes, as well as for measuring the outcomes (assessment).

(b) Implement (Course Delivery) - Carry out the learning plan and strategies planned for producing the outcomes.

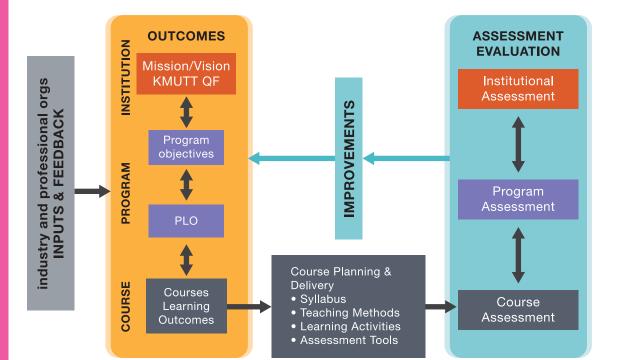
(c) Measure/Assess (Assessment) - Carry out the strategies planned for measuring the learning outcomes and objectives. Collect this data and analyze it to determine the results. (Assessment Phase). This phase is where feedback is obtained.

(d) Respond/Improve (Continuous Quality Improvement) - Determine what needs to be changed to make improvements. These changes are the basis of new or revised outcomes and objectives for the next cycle of the process. This process can be looked at on a program or course level.

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Source:

Adapted from http://www.dlsu.edu.ph/academics/colleges/coe/framework.asp



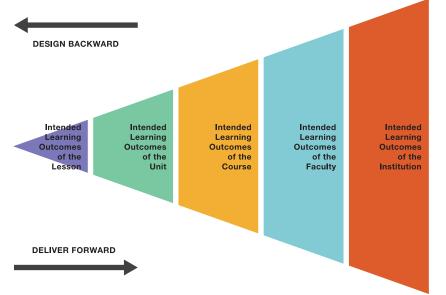
Backwards Design

Traditional models of teaching and instruction start with course activities and moved towards assessment and the identification of learning outcomes. Following this model

instructors choose to teach topics and skills they find most essential or interesting, or that align with directed curriculums or learning plans.

Developed by Wiggins & McTighe (2005) the **"backwards design"** educational model starts with the identification of desired learning goals, objectives and outcomes. A curriculum is then developed to meet those specific goals, objectives, and outcomes.





Plan for designing and delivering learning outcomes:

In designing course outcomes

- Start first with the broad outcomes expected of all students
- Then work backward to design academic program outcomes
- Finally design course outcomes that will lead to the achievement of both program and institutional outcomes.

When the program is delivered, students experience the system in reverse

- Student first participate in experiences that address lesson outcomes.
- The learning that results from these experiences accumulates as students proceed through the courses and other experiences in the program.
- The curriculum is designed so that it provides a coherent set of experiences leading to the development of desired knowledge and skills - students show increasing levels of sophistication and integration of skills as they progress through the program

Benefits of Backwards Design

- Improved program organization: Knowing what the end result should be can provide a guiding structure to program components
- Ease of assessment: Thinking about and planning for assessment at the start of a course or program ensures the appropriate data will be available for use
- Increased student engagement: When program activities have a known objective or purpose, students perceive those activities as have more value to them

O Source:

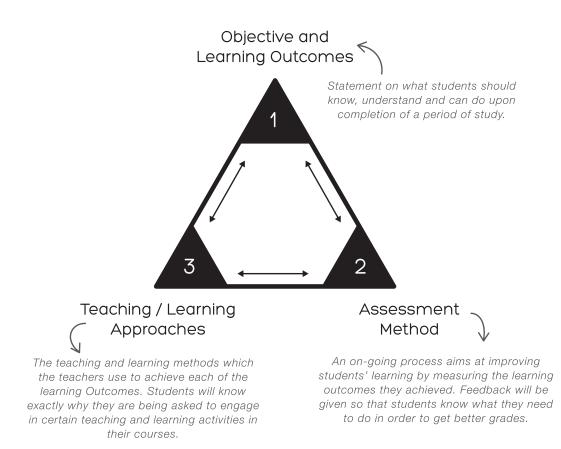
Wiggins, Grant, and Jay McTighe. (2005). Understanding by Design. Expanded 2nd Edition. Alexandria, VA: ASCD. available at http://carleton.ca/viceprovost/assessment-of-learning/curriculum-mapping-design/backwards-design/
 Eric P. Soulsby. (2009). Assessment note. University of Connecticut available at http://assessment.uconn.edu/docs/resources/Eric_Soulsby_Assessment_Notes.pdf

OBE: constructive alignment

What is constructive alignment?

Biggs (2003) defines constructive alignment as: The 'constructive' aspect refers to what the learner does, which is to construct meaning through relevant learning activities. The 'alignment' aspect refers to what the teacher does, which is to set up a learning environment that supports the learning activities appropriate to achieving the desired learning outcomes. The key is that the components in the teaching system, especially the teaching methods used and the assessment tasks are aligned to the learning activities assumed in the intended outcomes. The learner is 'trapped', and cannot escape without learning what is intended. In simple terms constructive alignment means that all assessment tasks, and learning and teaching experiences (and therefore content and methods) must be linked to the desired unit of study learning outcomes.

In order to ensure that your learning design is sound, your learning outcomes should be in line with the assessment that you are using to test for the achievement of learning outcomes. In addition, both learning outcomes and assessment should be aligned with the teaching method. We can imagine the relationship between these these three concepts forms a triangle; consequently it is often referred to as the "Triangle of effective learning".



4 Steps: Designing Constructively Aligned Teaching and Assessment

Step 1: Describe intended outcomes in the form of standards students are to attain using appropriate learning verbs.Step 2: Create a learning environment likely to bring about the intended outcomes.Step 3: Use assessment tasks enabling you to judge if and how well students' performances meet the outcomes.Step 4: Develop grading criteria for judging the quality of student performance.

Situational Analysis

Need Analysis

Normally a need/situational analysis and initial feasibility study begins before major curriculum work is undertaken and continues as the program develops. For example, an initial assessment of feasibility is made and, later as the program takes shape and specific resource needs are ascertained, program viability is reassessed.

What is a situation analysis?

In simple terms, a situation analysis is an effort undertaken by programme planners to gather and analyze information that will help them to design, implement and evaluate interventions. Typically, the kind of information collected relates to who is affected and why or how they are affected, the severity of the problem, and resources and strategies that might be employed to produce the desired outcomes. The goal of situation analysis is to identify key factors that might positively or negatively affect the implementation of a curriculum plan.

? Diagnostic questions

- How does the proposed program "fit" within the college's strategic plan?
- Are there other similar programs being offered in your area? In Thailand?
- How is the proposed program similar to/different from existing programs?
- What will be the impact of this program on others in your university?
- Who is the target audience for the program?
- What interests, abilities and experience are these learners likely to bring to the program?
- Will there be a demand for the program? Will there be sufficient numbers of learners interested in taking the program?
- What are the potential employment opportunities for graduates of this program?
- Will graduates be able to find employment in this field?
- What will be expected of program graduates on entry to the work place?
- What are the trends and issues in the field of study?
- Are there standards or guidelines for this program that are established by professional associations, labour groups, or government?
- Are learning experiences in work places (field work, clinical experience etc.) likely to be required? Is this experience available?
- Is this a stand alone program or will it be linked to other program(s).
- What are the possibilities for delivery options (semestered, continuous intake, intensive, online or blended learning, co-operative programs etc.)?

What you should think about

 Future trends: ageing society, global warming, ASIAN, Green/sustainable Energy, big data, STEM education, competency based learning, 21st century skills, KMUTT 3.0, etc.

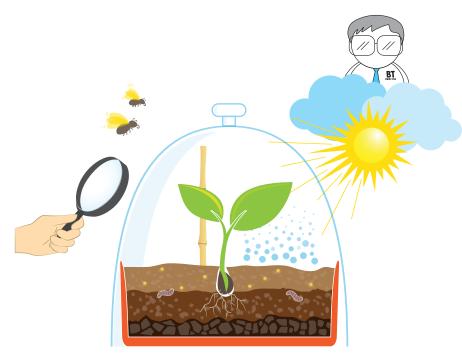
What are the macro environment factors (Social aspects or future trends) that important/impacting your program design/adjustment?

The macro environment is made up of broad factors in the economy and society within which the organization operates. These factors can include economic, sociocultural, political, legal, technological, and environmental considerations.

Examples: The 21st century skills, Ageing society, Green/sustainable energy, Global warming, the ASEAN Economic Community (AEC), Professional Standard , KMUTT 3.0, etc.

Additional Information

• KMUTT 3.0



KMUTT 3.0

How would KMUTT 3.0 (KMUTT in the future) look like?

Our graduates: social changes agents with a set of 'Competences' required for the unknown job of the future. They are versatile, innovative, and ready to solve the world problems, no matter what it would be.

Our teachers: people with passion in learning improvement and development of the students. With a clear set of learning outcomes, they design their classes to suite learning styles of students, they focus on what the students '**learn**' and '**will be able to do**' rather than what they should teach, they engage and connect with their students to teach them '**how to learn**'. They co-teach, team teach to make sure students could '**connect**' their prior knowledge to the new one. They plan the learning experience to grow '**curiosity**' or try not to kill it. They understand how tools and environment can be used to create the right atmosphere and conditions to promote learning. They are a '**life-long learner**' and thus they foster such competency with great emphasis on self-directed approach to learning.

Supporting staffs: work in the university with passion for learning improvement of our student and an understanding on how to provide the best support and service to make it happen.

For example, a HRD staff who knows that a great teacher would require the right training course and suitable development programs. A librarian, equipped with digital literacy skills, who understands the impact of Big Data and how to provide relevant

resources and services to support learning. A planning division with a vision of what required to drive a drastic change in education transformation. A HR personal who understands the process to encourage innovative thinking and the uniqueness of each staff development. A learning researcher who know how to turn studies into practical tools and processes for learning improvement of KMUTT teaching and learning. Faculty supporting staffs who put learning quality and our students in their top priority.

Our classroom: everywhere. At home, at the university, at work. KMUTT will provide a first-class education online and offline with the same focus on competency development of the students. At the university, the classroom infrastructure would be designed to be flexible with movable desks, chairs, boards, ICT tools etc – all of these to improve quality of learning. Classrooms could be anywhere around the university, and we might not call it classrooms but 'spaces' for everyone to learn.

Semester: would be much more flexible. A student could graduate in 3 years or 2.5 years if we can prove that he/she is qualify or pass our student QF standard. They will get lots of help and also allow to stay if they are not qualify to graduate. (there's nothing wrong when we do thing differently)

Research: KMUTT research outputs would reflect the focuses of the university both in Science & Engineering and Learning & Teaching.

Our image: we would be recognised as a super technical university with research focus and a Big passion in Learning and Teaching. Our staffs are passionate about learning development of our students, our services are tailored to facilitate every single part of learning development, our work culture would be very dynamic and '**Change**' is our good friend.

Who would benefit from KMUTT 3.0?

Everyone, especially our graduates, our country, our global community and KMUTT. Every single one of us would benefit from this.

What's the catch?

Behind every success, we would need to have a lot of perseverance and passion for the long-term goal. KMUTT 3.0. is a big change to what we know and how we do it now. We would need to invest a lots of time, money, effort to make it happen since we can't just keep doing the same thing and expect different results.

Resources Analysis People



Diagnostic questions

Academic Staff

- 1. Are academic staff members competent and qualified for their jobs?
- 2. Are the competencies and expertise of the academic staff adequate for delivering the programme?
- 3. What are the challenges institutions meet or encounter with regards to human resources, such as age distribution, difficulties in filling vacancies or in attracting qualified academic staff? How do institutions handle these challenges?
- 4. How many Master's and PhD degree holders are there among the academic staff?
- 5. What policy is pursued with regard to the employment of academic staff, both in teaching and research?
- 6. Is conscious effort made to involve professors in mentoring and/or training junior/new academic staff?
- 7. Is a policy in place with regard to the involvement in seminars, supervision of final papers, practical training or internship?
- 8. Are academic staff members satisfied with the teaching loads?
- 9. Is the staff-to-student ratio satisfactory?
- 10. What is the accountability of academic staff in terms of roles, responsibilities, academic freedom, and professional ethics?
- 11. What types of research activities are carried out by academic staff?
- 12. Are these activities aligned to the vision and mission of the university and faculty?
- 13. What is the level of research grants and how is it utilised?
- 14. What is the number of research papers published? Are the research papers published in national, regional and international journals?

Support Staff

- 1. Are the support staff members competent and qualified for their jobs?
- 2. Are the competencies and expertise of the support staff adequate?
- 3. What difficulties are there in attracting qualified support staff?
- 4. What policy is pursued with regard to the employment of support staff?
- 5. Are support staff members satisfied with their roles?





What you should think about

Academic Staff

- 1. Academic staff planning (considering succession, promotion, re-deployment, termination, and retirement) is carried out to fulfill the needs for education, research and service
- 2. Staff-to-student ratio and workload are measured and monitored to improve the quality of education, research and service
- 3. Recruitment and selection criteria including ethics and academic freedom for appointment, deployment and promotion are determined and communicated
- 4. Competences of academic staff are identified and evaluated
- 5. Training and developmental needs of academic staff are identified and activities are implemented to fulfill them
- 6. Performance management including rewards and recognition is implemented to motivate and support education, research and service
- 7. The types and quantity of research activities by academic staff are established, monitored and benchmarked for improvement

Support Staff

- 1. Support staff planning (at the library, laboratory, IT facility and student services) is carried out to fulfill the needs for education, research and service
- 2. Recruitment and selection criteria for appointment, deployment and promotion are determined and communicated
- 3. Competences of support staff are identified and evaluated
- 4. Training and developmental needs of support staff are identified and activities are implemented to fulfill them
- 5. Performance management including rewards and recognition is implemented to motivate and support education, research and service





Do you have enough qualified teachers, staff? If yes, please specify who they are?

	Role	Criteria 1	Criteria 2	Criteria 3	Criteria 4
Name:					
Name:					
Name:					
Name:					
Name:					
Name:					
Name:					
Name:					

1 | Situational Analysis | 5

* Criteria: หลักสูตร (ตรี / โท / เอก) จำนวน คุณวุฒิ คุณสมบัติ ผลงาน ฯลฯ ----> ดู Criteria จาก Additional Information

Additional Information



เกณฑ์มาตรฐานหลักสูตรระดับปริญญาตรีและบัณฑิตศึกษา พ.ศ.2558

	ตรี	Īn	เอก
อาจารย์ ประจำหลักสูตร	o คุณวุฒิขั้นต่ำปริญญาโทหรือเทียบเท่าหรือมีตำแหน่งผู้ช่วย ศาสตราจารย์ o มีผลงานทางวิชาการตามเกณฑ์ อย่างน้อย 1 รายการในรอบ 5 ปีย้อนหลัง o ไม่จำกัดจำนวน	o คุณวุฒิขั้นต่ำปริญญาโทหรือเทียบเท่า o มีผลงานทางวิชาการตามเกณฑ์อย่างน้อย 3 รายการในรอบ 5 ปีย้อนหลัง โดยอย่างน้อย 1 รายการต้องเป็นผลงานวิจัย o ไม่จำกัดจำนวน	o คุณวุฒิปริญญาเอกหรือเทียบเท่าหรือขั้นต่ำปริญญาโท หรือเทียบเท่าที่มีตำแหน่งรองศาสตราจารย์ o มีผลงานทางวิชาการตามเกณฑ์อย่างน้อย 3 รายการในรอบ 5 ปีย้อนหลัง โดยอย่างน้อย 1 รายการต้องเป็นผลงานวิจัย o ไม่จำกัดจำนวน
อาจารย์ ผู้รับผิดชอบหลักสูตร	o คุณวุฒิขั้นต่ำปริญญาโทหรือเทียบเท่าหรือมีต่ำแหน่งผู้ช่วย ศาสตราจารย์ o มีผลงานทางวิชาการตาม เกณฑ์ อย่างน้อย 1 รายการ ในรอบ 5 ปีย้อนหลัง o จำนวนอย่างน้อย 5 คน o กรณีที่หลักสูตรจัดให้มีวิชาเอกมากกว่า 1 วิชาเอก ให้จัด อาจารย์ผู้รับผิดชอบหลักสูตรที่มีคุณวุฒิและคุณสมบัติตรง หรือสัมพันธ์กับสาขาวิชาที่เปิดสอนไม่น้อยกว่า วิชาเอกละ 3 คน	o คุณวุฒิปริญญาเอกหรือเทียบเท่าหรือขั้นต่ำปริญญาโทหรือ เทียบเท่าที่มีตำแหน่งรองศาสตราจารย์ o มีผลงานทางวิชาการตามเกณฑ์อย่างน้อย 3 รายการ ในรอบ 5 ปีย้อนหลังโดยอย่างน้อย 1 รายการต้องเป็นผลงานวิจัย o จำนวนอย่างน้อย 3 คน	o คุณวุฒิปริญญาเอกหรือเทียบเท่าหรือขั้นต่ำปริญญาโทหรือ เทียบเท่าที่มีตำแหน่งศาสตราจารย์ o มีผลงานทางวิชาการตามเกณฑ์อย่างน้อย 3 รายการ ในรอบ 5 ปีย้อนหลัง โดยอย่างน้อย 1 รายการต้องเป็นผลงานวิจัย o จำนวนอย่างน้อย 3 คน
อาจารย์ผู้สอน	o มีคุณจุศวิขันต่ำปริญญาโทหรือเทียบเท่า หรือมีต่ำแหน่งผู้ช่วย ศาสตราจารย์ในสาขาวิชานั้นหรือสาขาวิชาที่สัมพันธ์กันหรือใน สาขาวิชาของรายวิชาที่สอน	o คุณวุฒิขั้นต่ำปริญญาโทหรือเทียบเท่า ในสาขาวิชานั้นหรือ สาขาวิชาที่สัมพันธ์กัน o มีประสบการณ์ค้านการสอน o มีผลงานทางวิชาการตามเกณฑ์อย่างน้อย 1 รายการ ในรอบ 5 ปีย้อนหลัง	o คุณวุฒิปริญญาเอกหรือเทียบเท่าหรือขั้นต่ำปริญญาไท หรือเทียบเท่าที่มีตำแหน่งรองศาสตราจารย์ในสาขาวิชานั้น หรือสาขาวิชาที่สัมพันธ์กัน o มีประสบการณ์ค้านการสอน มีผลงานทางวิชาการตามเกณฑ์ อย่างน้อย 1 รายการ ในรอบ 5 ปีย้อนหลัง
อาจารย์ที่ปรึกษาวิทยา นิพนธ์หลัก หรือ อาจารย์ที่ปรึกษาวิทยา นิพนธ์ร่วม หรือผู้สอบวิทยานิพนธ์		o เป็นอาจารย์ประจำ o มีคุณวุฒิปริญญาเอกหรือเทียบเท่า หรือขั้นต่ำปริญญาโท หรือเทียบเท่าที่มีตำแหน่งรองศาสตราจารย์ o มีผลงานทางวิชาการตามเกณฑ์อย่างน้อย 3 รายการ ในรอบ 5 ปี ย้อนหลังโดยอย่างน้อย 1 รายการต้องเป็นผลงานวิจัย	o เป็นอาจารย์ประจำ o มีคุณวุฒิปริญญาเอกหรือเทียบเท่า หรือขั้นต่ำปริญญาโทหรือ เทียบเท่าที่มีตำแหน่งรองศาสตราจารย์ o มีผลงานทางวิชาการตามเกณฑ์อย่างน้อย 3 รายการ ในรอบ 5 ปี ย้อนหลังโดยอย่างน้อย 1 รายการต้องเป็นผลงานวิจัย

Resources Analysis

Environments / Support / Finance

Diagnostic questions

- Are there enough lecture-halls, seminar rooms, laboratories, reading rooms, and computer rooms available? Do they meet the needs of students and staff?
- Is the library sufficiently equipped for education and research?
- Is the library accessible and within easy reach (location, opening hours)?
- Are there sufficient laboratory facilities including support staff?
- Do the laboratories meet the relevant requirements?
- Are sufficient teaching aids and tools available to students and staff?
- What hardware and software are made available to meet the needs of education and research?
- To what extent do the facilities and infrastructure promote or obstruct the delivery of the programme?
- Is the total budget for teaching aids and tools sufficient?
- How are the facilities and infrastructure being maintained?

What you should think about

- The teaching and learning facilities and equipment (lecture halls, classrooms, project rooms, etc.) are adequate and updated to support education and research
- The library and its resources are adequate and updated to support education and research
- The laboratories and equipment are adequate and updated to support education and research
- The IT facilities including e-learning infrastructure are adequate and updated to support education and research
- The standards for environment, health and safety; and access for people with special needs are defined and implemented
- The physical, social and psychological environment is conducive for education and research as well as personal well-being
- Would this curriculum need supporting machines, tools, and/or materials that would enable the learning of students? If yes, what would they be?

1

What other resources needed to implement this program?



Stakeholder Requirement Analysis

Higher Education has many stakeholders and all stakeholders have their own ideas about quality.

- These stakeholders include:
- The government or the state
- The employers
- The academic world
- The students
- The parents
- The Society at large

Each stakeholder will appreciate different aspects of quality and because all stakeholders have their own ideas and expectations, it can be said that Quality is a matter of negotiation between the academic world and the stakeholders. In this negotiation process, each stakeholder needs to formulate, as clearly as possible, his/her requirements. The organisation (faculty or department) as supplier of the academic training must try to reconcile all these different wishes and requirements.

As far as possible, the requirements of all stakeholders should be translated into the expected learning outcomes of the program.

2 Diagnostic questions

- Is the way to gather feedback from stakeholders structured and formal?
- What feedback mechanisms are used to gather inputs and feedback from staff, students, alumni and employers?
- Mechanisms such as surveys, questionnaires, tracer study, focus group discussions, dialogues, etc. are often used to gather inputs and feedback from stakeholders?
- Stakeholders' Satisfaction:
 - Staff:
 - What mechanisms are available to staff to express their satisfaction or dissatisfaction about the programme, resources, facilities, processes, policies, etc.?
 - What indicators are used to measure and monitor the satisfaction level of staff?
 - What initiatives are carried out to raise the satisfaction level of staff? Are they effective? Students:
 - Does the department know what students think about the courses, programme, teaching, examinations, etc.?
 - How does the department cope with the feedback and complaints from students? Alumni (Graduates):
 - What is the opinion and feedback of the graduates about the competencies that they acquired?
 - How is the feedback from the alumni used to improve the programme?
 - Labour market:
 - Are employers satisfied with the quality of the graduates?
 - Are there any specific complaints about the graduates?
 - Are specific strengths of the graduates appreciated by the employers?
- The stakeholder's feedback mechanisms are systematic and subjected to evaluation and enhancement.
- The satisfaction levels of stakeholders are established, monitored and benchmarked for improvement.
- Stakeholders' needs and feedback serve as input to curriculum design and development.

What you should think about

- What are the roles of the stakeholder in the design and review of curriculum?
- Who is being served (i.e. clients, customers, stakeholders) ?

- On scale 1 to 5 what industry impact do each stakeholder make?



Source: Guide to AUN-QA Assessment at Programme Level

| Situational Analysis | 9

1

Please list the potential stakeholders of your program,

1.	
2.	
З.	
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5.	

put in your methods of getting the stakeholder requirements,

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6.	

list of prioritised stakeholder requirements.

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З,	
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6.	

and integrate the stakeholder requirements into the formulated PLOs of your program (Next Chapter)

Additional Information

Conducting a stakeholder analysis

Step 1: Identify potential stakeholders

Stakeholders can include the people who conduct the needs assessment, the people who provide information or answer questions, the people who implement the changes, and the people who benefit from the changes. Stakeholders may include past, present and potential learners, instructors, employers, colleges/universities, academic advisors, funding agencies, other programs, administrators, professional associations, and community organizations (such as support agencies and places of worship).

The purpose of your needs assessment will determine the scope of your project and the number of stakeholders you will need to contact. For instance, if your purpose is to develop a specific course that has already been determined, such as workplace communication, stakeholders may include local employers, employment agencies, teachers and learners. If your purpose is to develop or revise a curriculum for learners who consistently transfer into other college/ university programs (e.g., hospitality and tourism, apprenticeships, or the Faculty of Engineering), stakeholders may include graduates from your program enrolled in the receiving program, as well as instructors from those programs who could provide information about curriculum requirements, materials, advice, as well as insight into what is challenging for the learners.

In other words, the needs analysis should facilitate the flow of information between your program and the people and organizations your program is affecting.

Step 2: Select appropriate methods

Methods of getting the stakeholder requirement

Existing Documentation

Much information on learner needs and trends may already be available in the form of learner evaluations, class evaluations, test results, post-program placement information, literature reviews, learner samples, and task analyses. Not only are these cost-effective sources of information, but a side benefit is that gathering this information allows you to establish contacts within the organization.

The disadvantages of depending on existing documentation, however, are that it is limited to past information, it may be difficult to access, and it may be difficult to analyze.

Interviews (telephone & face-to-face)

Interviews, whether by telephone or face-to-face, can be useful, especially at the beginning of a needs analysis project, to identify gaps and general areas of need. They can also be used to gather information prior to designing a questionnaire. In interviews, respondents do not have to be limited by a list of options (as often happens in questionnaires) – in fact, open-ended questions work best in interviews. Also, interviews allow for follow-up questions and probing into issues. The advantage of face-to-face interviews is that communication can be facilitated by non verbal communication, interpreters, and even visuals and medias (especially with language and literacy learners). The advantage of telephone interviews is that they can be a convenient and cost effective method of gathering input from native speakers or very fluent language learners.

However, there are drawbacks to interviews. Because interviews are time consuming, the number of interviews conducted is often limited. Also, the value of the information gathered during an interview is dependent on the interviewer's skill, and because interviews are less anonymous, respondents may be reluctant to volunteer negative information. Face-to-face interviews can be difficult to schedule and may include additional costs associated with travel. However, although telephone interviews are more cost-effective and easier to schedule, they can be especially intimidating and difficult for second language speakers, who often depend on non-verbal cues to make sense of communication.

Focus groups

Focus groups allow a group of 6-12 people (ideally) to explore an issue at the same time. As with interviews, open-ended questions work best, and focus groups may be used to gather input for designing a questionnaire. A facilitator can make good use of probing and follow-up questions, and the dynamics of a group working together can encourage brainstorming and may lead to more thorough discussion and analysis of a topic than individual interviews. However, focus groups can be difficult to schedule and they require a skilled facilitator as well as a note-taker. Recording and transcribing of discussions can be difficult if more than one person is speaking at the same time. Also, some participants may be reluctant to speak out in a public setting. Because focus groups are not anonymous, people may not feel comfortable presenting unpopular ideas, and sometimes only the ideas of the most outspoken participants are shared. Also, focus groups can be costly in terms of facility rental, transportation, refreshments, and so on.

Questionnaires (paper or electronic)

Questionnaires are a cost-effective means of getting information from many people at one time. Programs such as SurveyMonkey make the preparation of electronic surveys especially easy, and information is automatically tabulated. Another advantage of questionnaires is that they are generally anonymous – people can freely express their opinions without worrying about the repercussions of what they say. However, the downside is that there may be a low response rate, and you may have to follow-up with people to encourage them to complete the questionnaire. Open-ended questions are often skipped, and yet closed questions can limit options, making it difficult to identify gaps. Another complication is that questionnaires can be difficult for people with language and literacy issues, and electronic surveys may not be accessible to people who are not familiar with computers or who do not have computer/ internet access.

Step 3: Prioritize the needs

It is important to remember that needs are not objective facts. Instead, they are "subjective interpretations of information from a large variety of sources" (Richards, 2001, p.67). Therefore, depending on the scope of the project and the variety of answers, you may have to make judgment calls on how to prioritize needs. In making these judgment calls, you will need to consider parameters such as time, practicality, and fit with the philosophy and goals of your program/institution. The following are questions that can be asked to help prioritize the needs that emerge:

- Where do the needs fit within the existing curriculum?
- Can steps for addressing the needs be implemented in the short-term or should they become part of a longer-term plan?
- Are there feasible solutions?
- Are the needs critical or just desirable?
- How should contradictory information be treated?

Step 4: Integrate the results into curricula

Integrating the results into curricula occurs when you move from analyzing and reporting the findings to incorporating those findings into learning outcome statements, themes and projects, tasks and activities, materials, and assessments.

First, there should be a clear connection between the needs that you have identified, and the outcome statements in your curriculum. (Curriculum outcome statements show what the learner will be able to do after completing the class).

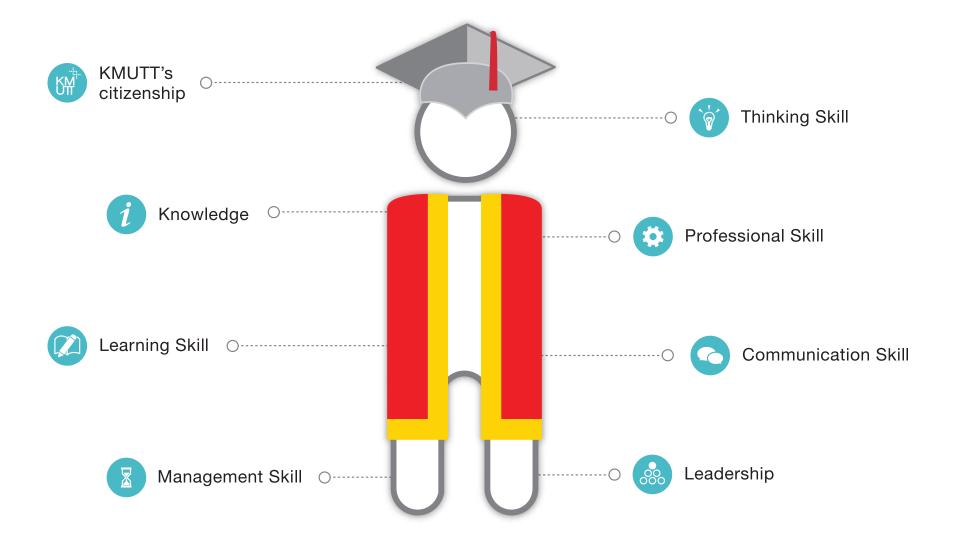


Determining Needs [ATESL Adult ESL Curriculum Framework]. [cited 2016 May 23]. Available from: http://www.atesldocuments com/cf/determiningNeeds



The KMUTT graduate

Upon completion of studies at KMUTT, students will gain the following skill sets and attributes in addition to their academic qualifications.





ความรู้ (Knowledge)

้ มีความเข้าใจเนื้อหาความรู้ (Content) ในแต่ละรายวิชางองหลักสูตร และสามารถนำความรู้ ไปประยกต์ใช้ในการประกอบวิชาชีพ และการดำเนินชีวิต



ทักษะการสื่อสาร (Communication Skill)

้มีทักษะในการใช้ภาษาไทย ภาษาอังกฤษได้ดีทั้งด้านการฟัง พูด อ่าน เงียน สามารถสื่อสารกับ ้ผู้อื่นได้อย่างถูกต้องเหมาะสม มีความสามารถในการถ่ายทอด การนำเสนอ มีวิจารณญาณที่ดี ในการรับฟัง



ทักษะเชิงวิชาชีพ

(Professional Skill)

ความสามารถเฉพาะ ในการนำความรู้มาสู่การปฏิบัติของศาสตร์ สาขาวิชา หรือความ สามารถอันเป็นจุดเด่นของหลักสูตร/สาขาวิชา

ทักษะการจัดการ (Management Skill)

้สามารถตั้งเป้าหมาย วางแผน และดำเนินการอย่างมีประสิทธิภาพ ภายใต้ข้อจำกัด ของทรัพยากร และอยู่บนพื้นฐานของคุณธรรมจริยธรรม เพื่อให้บรรลุเป้าหมาย ส่วนตน ทีมงาน องค์กรและสังคม ้สามารถคาดการณ์ถึงปัญหา ผลกระทบ ตลอดจนปัจจัยที่เกี่ยวข้องได้ รวมทั้งมีทัศนคติที่ดีและมี ความสามารถในการเตรียมพร้อม ป้องกัน และแก้ไขสถานการณ์หรือปัญหาเชิงรก



ทักษะการคิด

(Thinking Skill)

มีความคิดสร้างสรรค์ มีระบบความคิดที่มีเหตุผล รู้จักประมวลสารสนเทศ ระดมความคิด รอบด้านจากมุมมองที่แตกต่าง สามารถเลือกใช้แบบแผนความคิดที่หลากหลาย นำมาใช้ใน การแก้ไขปัญหาและตัดสินใจได้อย่างมีเหตมีผล



ทักษะการเรียนรู้ (Learning Skill)

้รู้จักแสวงหาความรู้ มองการเรียนรู้ว่าเกิดขึ้นได้ในทุกที่ทุกเวลา ซึ่งจะช่วยพัฒนาให้เป็นผู้เรียนรู้ ตลอดชีวิต สามารถเรียนรู้ผ่านสื่อต่าง ๆ ที่มีอยู่หลากหลายรูปแบบ มีระบบและระเบียบวิธีคิด ที่ดี สามารถแยกแยะ กลันกรองข้อมูลที่ได้มาจากการเรียนรู้ได้อย่างเหมาะสม



ภาวะผู้นำ

(Leadership)

้มีความเชื่อมั่นและเห็นคุณค่าในตนเองและผู้อื่น มีความเข้าใจพื้นฐานและความต้องการของทีม สามารถสร้างบรรยากาศการทำงานเป็นทีม สร้างแรงบันดาลใจ และกระตุ้นให้เกิดการสร้างสรรค์ สิ่งใหม่ ๆ รู้เท่าทันต่อสถานการณ์ โอกาส และความท้าทาย และสามารถแสวงหา/สร้างสรรค์วิธีการ ในการบรรลุเป้าหมายที่หลากหลาย มีความสามารถในการรับฟังอย่างลึกซึ้ง สามารถสื่อสารและ ประสานงานให้เกิดความร่วมมือในการคิดและลงมือทำงองทีม รวมทั้งเป็นแบบอย่างการปฏิบัติที่ดี

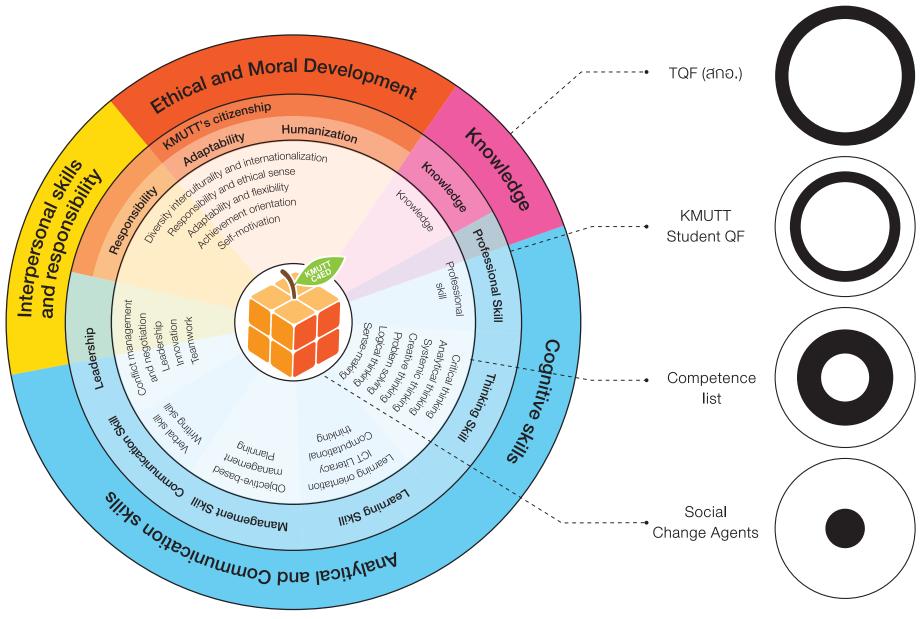


ความเป็นพลเมือง มจธ. (KMUTT's citizenship)

คือ ใช้ Core Value ของมหาวิทยาลัยเป็นแนวทางในการปฏิบัติซึ่งประกอบด้วย ความเป็นมือ อาชีพ และมีคุณธรรมจริยธรรม (Professional and Integrity) การยึดมั่นตามหลักปฏิบัติด้าน จรรยาบรรณองค์กร (Code of Conduct) เพื่อพัฒนาสู่การเป็นมนุษย์อย่างสมบูรณ์ (Humanization)

KMUTT Comp

KMUTT Competence Palette



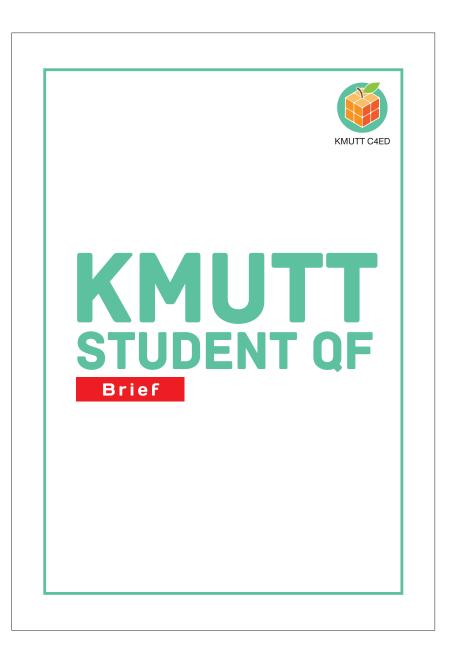
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• Request for a QF book

Contact us

8th floor, Classroom Building 4 (CB4) King Mongkut's University of Technology Thonburi.

Website: www.c4ed.kmutt.ac.th Email: c4ed.kmutt@gmail.com Tel : 02 470 8476 / 02 470 8328







Program Concept Philosophy - Beliefs and Values

The development of any curricula starts with a clarification of the beliefs and values that underpin and provide the foundation for the program. They may include statements of beliefs and values about the discipline, the roles and activities of the graduates, who they serve (clients, customers), and the teaching and learning process.

What you should think about

- What makes the program distinct?
- What are the motives to develop this curriculum?
- Why is this curriculum needed?
- How would this curriculum address the needs of all stake holders?
- How important would this curriculum to the students?
- What is the identity or the strength of this curriculum?

In your own view as the curriculum designer, what would be the common ground the curriculum would offer in general and specific, all based on the departments capability and how it perceives the world view per such capability.

Please put in the summarized key values and beliefs that will shape and guide program development



You may want to think about your own educational philosophy. These prompts to help faculty develop/update their educational philosophy were adapted from material originally developed by Georgian College for their new faculty mentoring program. It is used with permission from and thanks to Georgian College.

The sentence starters and questions below can be used to generate dialogue around your beliefs about teaching, learning and curriculum.

- I believe students...
- I believe learning...
- I believe success in learning is measured by...
- I believe students learn best when...
- I believe evaluation of learning...
- I believe students are motivated to learn when...
- I believe students are de-motivated when...
- I believe teaching...
- I believe success in teaching is determined by...
- I believe the source of curriculum is...
- I believe the purpose of curriculum is...
- I believe that curriculum should be organized by...
- I believe that what to include/exclude in curriculum can be determined by.....



Please put in the summarized key values and beliefs that will shape and guide program development

Sample Educational Philosophy Statements - Personal statement

Sample #1 My Philosophy Statement on Education

I believe that each child is a unique individual who needs a secure, caring, and stimulating atmosphere in which to grow and mature emotionally, intellectually, physically, and socially. It is my desire as a educator to help students meet their fullest potential in these areas by providing an environment that is safe, supports risk-taking, and invites a sharing of ideas. There are three elements that I believe are conducive to establishing such an environment, (1) the teacher acting as a guide, (2) allowing the child's natural curiosity to direct his/her learning, and (3) promoting respect for all things and all people.

When the teacher's role is to guide, providing access to information rather than acting as the primary source of information, the students' search for knowledge is met as they learn to find answers to their questions. For students to construct knowledge, they need the opportunity to discover for themselves and practice skills in authentic situations. Providing students access to hands-on activities and allowing adequate time and space to use materials that reinforce the lesson being studied creates an opportunity for individual discovery and construction of knowledge to occur.

Equally important to self-discovery is having the opportunity to study things that are meaningful and relevant to one's life and interests. Developing a curriculum around student interests fosters intrinsic motivation and stimulates the passion to learn. One way to take learning in a direction relevant to student interest is to invite student dialogue about the lessons and units of study. Given the opportunity for input, students generate ideas and set goals that make for much richer activities than I could have created or imagined myself. When students have ownership in the curriculum, they are motivated to work hard and master the skills necessary to reach their goals.

Helping students to develop a deep love and respect for themselves, others, and their environment occurs through an open sharing of ideas and a judicious approach to discipline. When the voice of each student is heard, and environment evolves where students feel free to express themselves. Class meetings are one way to encourage such dialogue. I believe children have greater respect for their teachers, their peers, and the lessons presented when they feel safe and sure of what is expected of them. In setting fair and consistent rules initially and stating the importance of every activity, students are shown respect for their presence and time. In turn they learn to respect themselves, others, and their environment.

For myself, teaching provides an opportunity for continual learning and growth. One of my hopes as an educator is to instill a love of learning in my students, as I share my own passion for learning with them. I feel there is a need for compassionate, strong, and dedicated individuals who are excited about working with children. In our competitive society it is important for students to not only receive a solid education, but to work with someone who is aware of and sensitive to their individual needs. I am such a person and will always strive to be the best educator that I can be.



Sample #2 Philosophy Statement

I believe the children are our future...

I believe each and every child has the potential to bring something unique and special to the world. I will help children to develop their potential by believing in them as capable individuals. I will assist children in discovering who they are, so they can express their own opinions and nurture their own ideas. I have a vision of a world where people learn to respect, accept, and embrace the differences between us, as the core of what makes life so fascinating.

Teach them well and let them lead the way...

Every classroom presents a unique community of learners that varies not only in abilities, but also in learning styles. My role as a teacher is to give children the tools with which to cultivate their own gardens of knowledge. To accomplish this goal, I will teach to the needs of each child so that all learners can feel capable and successful. I will present curriculum that involves the interests of the children and makes learning relevant to life. I will incorporate themes, integrated units, projects, group work, individual work, and hands-on learning in order to make children active learners. Finally, I will tie learning into the world community to help children become caring and active members of society.

Show them all the beauty they possess inside. Give them a sense of pride...

My classroom will be a caring, safe, and equitable environment where each child can blossom and grow. I will allow children to become responsible members of our classroom community by using strategies such as class meetings, positive discipline, and democratic principles. In showing children how to become responsible for themselves as well as their own learning, I am giving them the tools to become successful in life, to believe in themselves, and to love themselves.

Let the children's laughter remind us how we used to be...

Teaching is a lifelong learning process of learning about new philosophies and new strategies, learning from the parents and community, learning from colleagues, and especially learning from the children. Children have taught me to open my mind and my heart to the joys, the innocence, and the diversity of ideas in the world. Because of this, I will never forget how to smile with the new, cherish the old, and laugh with the children.



Sample Educational Philosophy Statements - Program statement

Sample #3 Bachelor of Education Philosophy Statement

The B.Ed. (Primary) program at the University of Tasmania aims to educate teachers who are committed to high quality teaching and learning and making a difference to the life chances of young people. We seek to educate ethical, reflective and highly regarded professionals committed to meeting the needs of children. In unlocking the potential of our initial teacher education students, we expect a high level of personal, academic, intellectual and professional engagement. We want beginning teachers to develop cognitive and meta-cognitive capabilities in order to be able to think analytically about the complexities of teaching and learning and to incorporate insights from theory and research evidence into their developing classroom practice. The program is underpinned by integral professional experiences that give students opportunities to apply their knowledge and skills in different learning and community contexts. The learning outcomes for the course are framed by the Graduate Teacher Standards established by the Australian Institute for Teaching and School Leadership (AITSL) and by the disciplinary Threshold Learning Outcomes for Bachelor Level study of Education. However, our program aims to extend beyond these standards. Both disciplinary and professional studies units of study support the initial teacher education students' articulation of well-developed pedagogical reasoning in support of increasingly confident, active and purposeful teaching practice.

Program Concept Graduate attributes

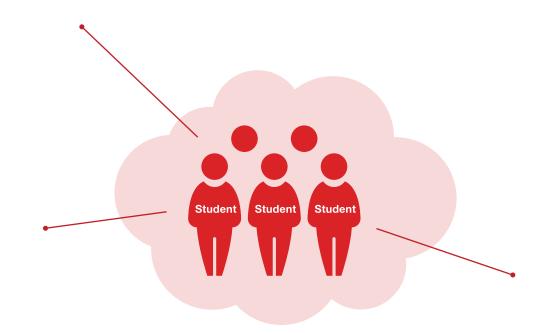
To generate program outcomes, we encourage departments to begin with their ideal graduate. What knowledge, skills, and values would students in your department develop if there were unlimited resources? If you had the freedom to focus on any area in your discipline, what would you want your students to learn? Ultimately, this list of attributes, which is often developed through a brainstorm at a program retreat or a department meeting, reflects who the department wants its students to be.

What you should think about

- How would the designed curriculum shape the graduates ?
- What would be the graduates' performances ?
- How would the curriculum reflect its strength over others ?



Describe your vision of a Graduate attributes.

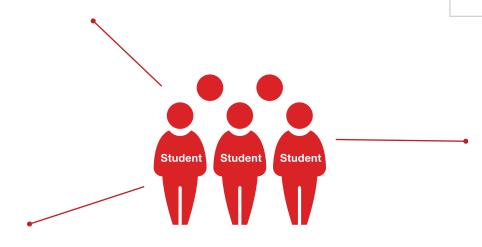


The students

With the graduate attributes mentioned, let's now consider your potential students. From your experience, please specify who your students are.



What range of backgrounds and previous experience is typically represented among students in this program? What are students' motivations for this program? How do they learn?



Note: Can you see the gap between your list of graduate attributes and who your students are before taking this programs?

Objectives and Outcomes

Objectives

An objective is a description that captures the purpose and the justification for the existence of the program. In addition, the graduates are described in terms of their professional role or function, who they serve, and the setting where they will work. The needs to link well with the beliefs and values.

What is the difference between objectives and learning outcomes?

The **objective** of a programme is usually a specific statement of teaching intention, i.e. it indicates one of the specific areas that the teacher intends to cover in a block of learning. For example, one of the objectives of a module could be that "students would understand the impacts and effects of behaviours and lifestyles on both the local and global environments". (In some contexts, objectives are also referred to as goals). **Learning outcomes**, however, is a clear statements of what the learner is expected to know, understand and/or be able to demonstrate after completion of a process of learning. Thus, learning outcomes are more precise, easier to compose and far clearer than objectives.

? Diagnostic questions

- What is the purpose of the study program?

What you should think about

- What does the program strive to accomplish?

Please list out the prioritised objectives of your program



Please list out the prioritised objectives of your program

The objectives of the Civil Engineering

The postgraduate Program educational objectives (PEOs) are as follows;

- PEO 1 : Mastery of competencies and integration of knowledge required in the profession.
- PEO 2 : An appreciation of the value of lifelong learning and possessing enthusiasm and strong commitment to continued acquisition of new knowledge and skills.
- PEO 3 : Advanced leadership and team working skills that allow professionals to become visionary and inspirational leaders.
- PEO 4 : Highly developed oral and written communications skills that fit at all level, appropriate to the field of profession.
- PEO 5 : An appreciation of the ethics and integrity in management, leadership and good governance, and responsibility to their professions and community.

The objectives of the Mechanical Engineering undergraduate program are to produce graduates who:

- Vigorously engage in post-baccalaureate endeavors, whether in engineering graduate study, in engineering practice, or in the pursuit of other fields, such as science, law, medicine, business or public policy.
- Apply their mechanical engineering education to address the full range of technical and societal problems with creativity, imagination, confidence and responsibility.
- Actively seek out positions of leadership within their profession and their community.
- Serve as ambassadors for engineering by exhibiting the highest ethical and professional standards, and by communicating the importance and excitement of this dynamic field.
- Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges of the 21st century.

EXAMPLE

Additional Information



• From objectives to intended learning outcomes in Civil Engineering

Objectives	Intended learning outcomes			
The postgraduate Program educational objectives (PEOs) are as follows;	The Programme Learning Outcomes (LOs) are attributes that are expected to be attained by students upon completion of their postgraduate degree in Civil Engineering programme. Our programme Learning Outcomes are described as follows;			
 PEO 1 : Mastery of competencies and integration of knowledge required in the profession. PEO 2 : An appreciation of the value of lifelong learning and possessing enthusiasm and strong commitment to continued acquisition of new knowledge and skills. PEO 3 : Advanced leadership and team working skills that allow professionals to become visionary and inspirational leaders. PEO 4 : Highly developed oral and written communications skills that fit at all level, appropriate to the field of profession. PEO 5 : An appreciation of the ethics and integrity in management, leadership and good governance, and responsibility to their professions and community. 	 PO 1 : Advanced Knowledge Graduate are able to incorporate in-depth relevant knowledge in professional practices for the benefits of both national and international communities. Graduates are able to apply their knowledge and skills in the planning, analysis, design and supervision of works related to the civil engineering discipline. PO 2 : Critical Thinking and Research Graduate are able to manage conducive working environment qualities problem solving and higher order thinking skills. Graduates are technically competent in solving problems logically, analytically and creatively based on sound facts and ideas. PO 3 : Communication Graduate are able to apply a wide range of relevant knowl- edge through effective oral and written communications. Graduates are able to communicate effectively across a range of contexts and audiences. 	 PO 4 : Professional Ethics and Integrity Graduate are able to balance professional and ethical responsibilities including contemporary issues and environmental awareness. PO 5 : Life-long learning Graduate are able to adopt the latest relevant knowledge and cutting-edge technologies through life-long learning process. PO 6 : Management and Entrepreneurship Graduates are able to explain managerial concepts and identify business opportunities and initiate action to achieve it PO 7 : Teamwork and Leadership Graduate are able to manage conducive working environment qualities through effectiveleadership and team working skills that allow professionals to become visionary and inspirational leaders 		

Ο

• From objectives to intended learning outcomes in Mechanical Engineering

Objectives	Intended learning outcomes
The objectives of the Mechanical Engineering undergraduate program are to produce graduates who:	The Department of Mechanical Engineering has adopted the ABET Outcomes as its Program Outcomes. These are that our graduates have:
 Vigorously engage in post-baccalaureate endeavors, whether in engineering graduate study, in engineering practice, or in the pursuit of other fields, such as science, law, medicine, business or public policy. Apply their mechanical engineering education to address the full range of technical and societal problems with creativity, imagination, confidence and responsibility. Actively seek out positions of leadership within their profes- sion and their community. Serve as ambassadors for engineering by exhibiting the highest ethical and professional standards, and by communi- cation the importance and evolution of this dynamic field. 	 An ability to apply knowledge of mathematics, science, and engineering. An ability to design and conduct experiments, as well as to analyze and interpret data. 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. An ability to function on multi-disciplinary teams. An ability to identify, formulate, and solve engineering problems. An understanding of professional and ethical responsibility. An ability to communicate effectively. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
cating the importance and excitement of this dynamic field. - Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges of the 21st century.	 -A recognition of the need for, and an ability to engage in life-long learning. -A knowledge of contemporary issues. -An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

• From objectives to intended learning outcomes in an engineering course

Objectives	Intended learning outcomes
1. To provide an understanding of the kinematics and kinetics of machines and the fundamental concepts of stress and strain analysis.	1. To <i>describe</i> the basic principles of kinematics and kinetics of machines and the fundamental concepts of stress and strain analysis.
2. To develop an analytical understanding of the kinematics and kinetics and elastic behaviours of machine elements under loading.	2. Using given principles, to <i>solve</i> a mechanical problem that involves loading and motion.
	3. To select relevant principles to obtain the solutions for mechanical problems.
	4. To <i>present</i> analyses and results of experiments in a proper format of a written report such that a technically qualified person can follow and obtain similar findings.

Program-level Learning Outcomes

Outcomes are statements that describe what students will be able to know (cognitive), do (psychomotor), and feel/model (affective) by the end of the program or course of study. Outcomes describe measurable behaviours. Most outcomes have three parts: an action, a topic, and a criterion or context. In general, we recommend developing eight to twelve outcomes for the program. In practice, many graduate programs have fewer, perhaps six to eight outcomes.

Program - level learning outcomes (PLOs) are direct statements that describe what learners will be able to do at the end of the program. They focus on transferable knowledge, skills and behaviors that can be observed and assessed, and are reflective of disciplinary contexts. Learning outcomes answer the questions:

- How would you describe the attributes of an ideal graduate of the program? What unique strengths should students who complete this program possess?
- What is essential that students know and be able to do at the end of their learning experiences? What key knowledge, skills and values/attitudes should students who complete the program possess?

The following guidelines should be considered when preparing learning outcomes statements. Learning outcomes should:

- complete a phrase describing what students should know and/or be able to do by the end of the program (e.g. "By the end of this program, successful students will be able to...").
- 2) start with an action verb that specifying the depth of learning expected (See Additional information for a list of action verb), followed by a statement describing the knowledge and abilities to be demonstrated, and finally a statement (or statements) to provide context within the discipline.
- Note: In this guide, we have provide a simple structure of PLO statement as Action Verb, Object and Qualifying phase. The qualifying phase indicating 'how well' the evidence of learning should be demonstrated at the end of the program.
- 3) be observable and measurable. PLO must be capable of being assessed, based on clearly defined criteria associated with the teaching/learning activities and assessment strategies contained within the curriculum.

Tips on writing PLOs

- Don't work alone. Engage colleagues and representatives from professional associations, advisory committees or the work place to help you identify current needs and trends in the field or discipline.
- Check to see if there are published program standards for the program. If there are, you can use these as they are or you may want to modify or add to these learning outcomes to reflect the needs of your program. You will need to show that the outcomes you develop meet the outcomes published in the program standard.
- Choose the verbs carefully. The verbs are the "powerhouse" of the outcome statement.
- Review your draft outcomes with someone else to see if they are clear to them.
- Use SMART checklist (provide in Additional information) to review your PLOs.

? Diagnostic questions

- What is the purpose of the study programme?
- What are the expected learning outcomes?
- How are the expected learning outcomes formulated?
- Do the learning outcomes reflect the vision and mission of the university, faculty or department?
- Does the labour market set any specific requirements for graduates to meet?
- To what extent is the content of the programme tuned to the labour market?
- Is there a well-defined job profile?
- How are the learning outcomes made known to staff and students?
- Are the learning outcomes measurable and achievable? How?
- To what extent have the learning outcomes been achieved?
- Are learning outcomes being reviewed periodically?
- How are the learning outcomes translated into concrete requirements of the graduate (i.e. knowledge, skills and attitudes including habits of mind)?

What you should think about

- PLOs have been clearly formulated and aligned with the vision and mission of the university
- PLOs cover both subject specific and generic (i.e. transferable) learning outcomes
- PLOs clearly reflect the requirements of the stakeholders

Write down the prioritised PLOs of your program

Program name:		
At the end of this program, graduates will be able to	Action verb + Object + Qualifying phrase	
	G	
В	Η	
•		

EXAMPLE

Program name: Master of Business Administration

At the end of this program, graduates will be able to....



В

С

D

- identify and diagnose business problems accurately and effectively across a wide range of business domains, including management practices, accounting and financial management, operations, marketing, and strategic management. assess accurately the performance of an organization across a wide range of performance criteria, including but not limited to financial, operational, ethical, and marketing effectiveness criteria. utilize both quantitative and qualitative techniques and evaluations to forecast changes that will affect a business in the future.
 - identify, select, and justify strategies and courses of action at the functional, business, and corporate levels of analysis.



develop effective plans for the implementation of selected strategies across a wide range of business domains and levels.



communicate effectively in a managerial role, including effective
presentation of analysis, justification of recommended actions, and
persuasive messages intended to affect the perceptions of others.

G	negotiate effectively, and to collaborate with others in situations characterized by differing interests and objectives.
H	formulate strategies for creating workplace cultures characterized by a sense of mission, shared values, and high levels of commitment and motivation.
	evaluate business opportunities.
J	assess and discuss the ethical and social implications of situations, actions, policies, and proposals.
K	·····
D	



Additional Information

• AUN-QA Criterion 1

- 1. The formulation of the expected learning outcomes takes into account and reflects the vision and mission of the institution. The vision and mission are explicit and known to staff and students.
- The program shows the expected learning outcomes of the graduate. Each course and lesson should clearly be designed to achieve its expected learning outcomes which should be aligned to the programme expected learning outcomes.
- 3. The program is designed to cover both subject specific outcomes that relate to the knowledge and skills of the subject discipline; and generic (sometimes called transferable skills) outcomes that relate to any and all disciplines e.g. written and oral communication, problem-solving, information technology, teambuilding skills, etc.
- 4. The program has clearly formulated the expected learning outcomes which reflect the relevant demands and needs of the stakeholders.

Explanation

Outcomes-based education (OBE) can be described as a way in which curriculum is defined, organised and directed based on all the things that learners would learn and demonstrate successfully when they complete the study programme. The focus of OBE is on the results of learning, where the knowledge, skills and attitudes including habits of mind, the learners are expected to learn are clearly identified and expressed as expected learning outcomes.

The expected learning outcomes, which are formulated from the needs of the stakeholders, form the starting point of the programme design. Learning outcomes are concerned with the achievements of the learner rather than the intentions of the teacher, which are often written as aims, goals or objectives of the programme.

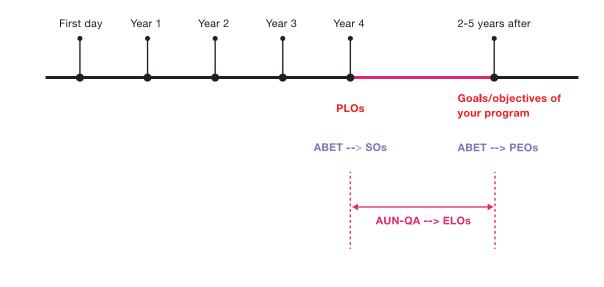
Learning outcomes should be written in a way where learning is translated into observable and measurable results which can be demonstrated and assessed.

• Learning outcomes should be SMART

- **SPEAK TO THE LEARNER:** learning outcomes should address what the learner will know or be able to do at the completion of the course
- MEASURABLE: learning outcomes must indicate how learning will be assessed
- APPLICABLE: learning outcomes should emphasize ways in which the learner is likely to use the knowledge or skills gained
- **REALISTIC:** all learners who complete the activity or course satisfactorily should be able to demonstrate the knowledge or skills addressed in the outcome
- **TIME-BOUND:** the learning outcome should set a deadline by which the knowledge or skills should be acquired;
- **TRANSPARENT:** should be easily understood by the learner; and
- **TRANSFERABLE:** should address knowledge and skills that will be used by the learner in a wide variety of contexts

О Source: The SMART(TT) method of goal setting is adapted from Blanchard, K., & Johnson, S. (1981). The one minute manager. New York:

Comparison of **AUN-QA / ABET**



AUN-QA = Asean University Network Quality Assurance ELOs = Enpected Learning Outcomes PLOs = Program-level Learning Outcomes ABET = Accreditation Board for Engineering and Technology PEOs = Program Educational Objectives SOs = Student Outcomes



Bloom's Taxonomy of Learning Domains

Head	Ve Domain	Applying Action Verbs: Apply,	Analyzing Action Verbs: Analyze, Assume, List,	Action Verbs: Agree, Appraise, Assess, Mark, Award, Choose, Select, Compare, Conclude, Criteria,	Change, Choose, Combine, Compile, Plan, Compose, Construct, Create, Delete, Design, Develop, Discuss,	
Remembering Action Verbs: Choose, Define, Find, How, Label, List, Match, Name, Omit, Recall, Relate, Select, Show, Spell, Tell, What, When, Where, Which, Who, Why	Action Verbs: Classify, Compare, Contrast, Demonstrate, Explain, Extend, Illustrate, Infer, Interpret, Outline, Relate, Rephrase, Show, Summarize, Translate	Build, Choose, Plan, Construct, Develop, Experiment with, Solve, Identify, Interview, Make use of, Model, Select, Organize, Utilize	Categorize, Classify, Divide, Compare, Survey, Conclu- sion, Contrast, Discover, Dissect, Theme, Distinguish, Examine, Inference, Inspect, Motive, Simplify, Take part in, Test for, Function, Relation- ships	Criticize, Decide, Judge, Deduct, Defend, Justify, Determine, Rate, Disprove, Estimate, Evaluate, Explain, Prove, Importance, Influence, Interpret, Measure, Value, Opinion, Perceive, Prioritize, Recommend, Rule on, Support	Invent, Elaborate, Estimate, Formulate, Happen, Imagine, Improve, Make up, Maximize, Minimize, Modify, Original, Test, Originate, Predict, Solve, Propose, Solution, Suppose, Theory	
	ve Domain		Organization Action Verbs: adheres.	Internalizing values (characterization) Action Verbs: acts,		
Receiving Phenomena Action Verbs: asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.	Responding to Phenomena Action Verbs: answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes.	Valuing Action Verbs: completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works.	alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.	displays, discriminates, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.	ſ	Origination
Develo		-		Complex Overt	Adaptation Action Verbs: adapts,	Action Verbs: arranges, builds,
Psycho Perception (awareness) Action Verbs: chooses, describes, detects,identifies, differentiates, relates,	Set Action Verbs: begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers.	Guided Response Action Verbs: copies, traces, follows, react, reproduce, responds.	Mechanism (basic proficiency) Action Verbs: assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, mixes, manipulates, measures, mends, organizes,	Response (Expert) Action Verbs: assembles, builds, calibrates, constructs, dismantles, displays, heats, fastens, fixes, manipulates, measures, grinds, mends, mixes, organizes, sketches.	alters, changes, rearranges, revises, varies, reorganizes.	combines, composes constructs, creates, designs, initiate, makes, originates.

Source:

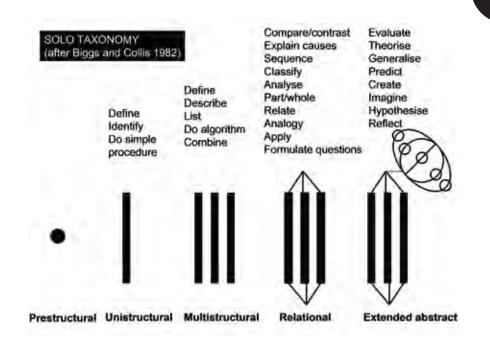
Bloom, B.S., Englehart, M.B., Furst, E.J., Hill, W.H., and Krathwohl, D.R. (1956). Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I: The Cognitive Domain. New York: Longman Clark, D. (1999). Learning Domains or Bloom's Taxonomy [Online], Available: http://www.nwlink.com/~donclark/hrd/bloom.html [12 Mar 2015].

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• The SOLO Taxonomy

Constructive alignment also marries well with the SOLO taxonomy. SOLO stands for "structure of observed learning outcomes" and is a concept devised by John Biggs and Kevin Collis in 1982 to describe levels of increasing complexity in students' understanding. The SOLO taxonomy helps to map levels of understanding that can be built into intended learning outcomes and create assessment criteria or rubrics. It consists of five levels of understanding:

- **Pre-structural:** a student hasn't understood the point and offers a simple incorrect response. A student at the pre-structural stage will usually respond with "I don't understand".
- Uni-structural: a student's response only focuses on one relevant aspect. A student at the uni-structural stage might give a response such as "I have some understanding of this topic".
- Multi-structural: here, a student's response focuses on several relevant aspects but these are treated independently of each other. Assessment at this level is primarily quantitative. A student at the multi-structural stage might give a response such as "I know a few things about this topic".
- Relational: Here, the different aspects seen at the multi-structural level have become integrated to form a coherent whole. At this level, a student's understanding moves from quantitative to qualitative in that the different aspects are linked and integrated and now contribute to a deeper understanding of the whole. A student at the relational stage might give a response such as "I can see the connections between the information".
- Extended abstract: the integrated whole is now conceptualised at a higher level of abstraction. According to Hook and Mills (2011), the new understanding that emerges at the extended abstract level is "rethought" at another conceptual level, looked at in a new way, and used as the basis for prediction, generalisation, reflection, or creation of new understanding. A student at the extended abstract stage might give a response such as: "By reflecting and evaluating on my learning, I am able to look at the bigger picture and link lots of different ideas together."



As students move up the five levels, their understanding grows from surface to deep to conceptual. The SOLO taxonomy also helps develop a growth mindset because students come to understand that declarative and functioning learning outcomes are the result of effort and the use of effective strategies rather than the result of innate ability.

Source:

Matt Bromley,(2015). The SOLO taxonomy and constructive alignment [Online], Available: http://www.sec-ed. co.uk/best-practice/pedagogy-the-solo-taxonomy-and-constructive-alignment/ [23 September 2015] $^{c1}_{c2}$ | Objectives and Outcomes | ω

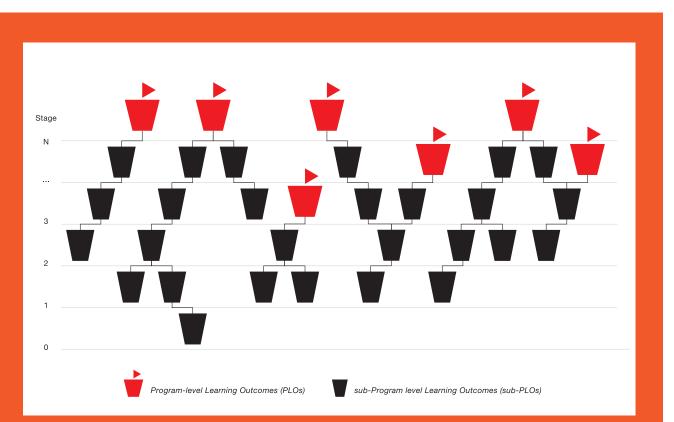
Panhook, (2008). The Learning Process [Online], Available: http://pamhook.com/wiki/The_Learning_Process [4 July 2016].

Structure and Sequence

The organisation of the program

Any concerned PLO's could be complex and take over several semesters if not the whole 4 years to develop. Typical PLO being described with broad action verbs could sometimes be difficult to be assessed in a straightforward manner. Breaking it down into a set of smaller and manageable sub-PLO's is, therefore, so rational that students could progressively and sequentially attain by design.

In other words, sub-PLOs can be viewed as a set of learning outcomes organised into parts/groups based on PLO's construction methods. With the logical way of designing the structure of PLOs' attainment, the PLO then could be measured through its own sub-PLOs, of which can be disseminated to different elements, and sometimes at different levels, of your curriculum. For example, a sub-PLO can be delivered as part of a core course, a group of courses (modules), an extracurricular activity, or other core elements of the curriculum.



The relationship between Program-level Learning Outcomes and their Sub-Program-level Outcomes: Often a Learning Outcome (PLO) in a given curriculum is very much dependent on its own several Sub Learning Outcomes (sub-PLOs) which are nonexclusively scattered in the levels of Chapters, Modules, and/or Courses throughout the curriculum in which students will progressively attain sub PLOs in order to achieve that particular PLOs.

55

FAQ:

1) Is a sub-PLO the same thing as a course learning outcome (CLO)?

That depends. Sub-PLOs are steps to achieve the PLO or components required to achieve the PLO. It can be delivered via many components of a curriculum e.g. a class, an activity or a group of classes/module. If a sub-PLO is small enough to fit in course, a course can be used to deliver a sub-PLO. However, this doesn't indicate that a sub-PLO is always equal to a CLO because a course can be used to deliver more than one sub-PLOs and a sub-PLO can also take many courses to achieve.

However, for a curriculum with not many components such as in graduate programs (Master or Ph.D. programs) where there are only a few courses within a program, it's highly likely that sub-PLOs are identical to CLOs since the program doesn't require a complex structure as compared to a bachelor degree program.

2) what's the relationship between a sub-PLO and a CLO then?

As mentioned before, we think of a set of sub-PLOs as steps to achieve a PLO without an assumption about existing courses, or other program elements. Put it simply, a set of sub-PLOs is basically a set of learning outcome that has been backwardly designed to aligned with a PLO. Since there are many elements of a program beside courses, calling them based on a type of element, such as a CLO, means that we 'know' that all the learning outcomes will be delivered in courses which might not be the case. Ultimately we want to ensure that all desired PLO's are diffused through all courses. To facilitate such permeation, we might optionally breakdown sub PLO's into a group of components of Knowledge (K), Skills (S), and Attitudes (A) herewith are defined below.



Knowledge: Discipline Specific, contents including concepts, theories, and foundation information.



Skill: the application of theory, hands-on practical tasks. Repeated practice & repetition create permanent connections in the brain that allow us to things automatically.



Attitudes: Personal perspective, influenced by society, peers, families, educators, employers. These are different for each learner based on motivations, goals, and self concept.

All sub PLO's are decomposed into groups of KSA components. We then design (compile) the courses (modules) with the combinations of the desired KSA components.

The curriculum designers would define what competences the student would need to develop in order to attain such PLOs (and/or sub PLOs). Such competences can merely be developed out of accumulated Knowledge, Skills, and/or Attitudes as designed and cascaded in the curriculum planning.

The designers, therefore, need to consider 2 main points:

What are the competences the student need to develop in order to attain the stated PLOs (and/sub PLOs)?
 How to progress the developed competences throughout the curriculum in order to maximize the learning outcomes.

Diagnostic questions

- Do the contents of the program reflect the expected learning outcomes?
- How are the courses in the program structured so that there is coherence and a seamless relationship of the basic and specialised courses such that the curriculum can be viewed as a whole?
- Has a proper balance been struck between specific and general courses?
- How is the content of the program kept up-to-date?
- Why is this program structure chosen?
- Has the educational program been changed structurally over recent years? If so, why?
- Does the program promote diversity, student mobility and/or cross-border education?
- Is the relation between basic courses, intermediate courses and specialised courses in the compulsory section and the optional section logical?
- What is the duration of the program?
- What is the duration and sequence of each course? Is it logical?
- What benchmarks are used in designing the program and its courses?
- How are teaching and learning methods and student assessment selected to align with the expected learning outcomes?

What you should think about

- The curriculum, teaching and learning methods and student assessment are constructively aligned to achieve the expected learning outcomes.
- The curriculum is designed to meet the expected learning outcomes where the contribution made by each course in achieving the program's expected learning outcomes is clear.
- The curriculum is designed so that the subject matter is logically structured, sequenced, and integrated.
- The curriculum structure shows clearly the relationship and progression of basic courses, the intermediate courses, and the specialised courses.
- The curriculum is structured so that it is flexible enough to allow students to pursue an area of specialisation and incorporate more recent changes and developments in the field.
- The curriculum is reviewed periodically to ensure that it remains relevant and up-to-date.

- The competencies are observable or measurable Skills, Knowledge, and Attitudes (KSA).
- The KSA must distinguish between superior and other performers.
- Learning Outcomes (LO) describe the integration of Knowledge, Skills, and Attitudes (Including values and judgments) into abilities that are transferable to real life and include both "hard" and "soft skills". In turn, these abilities are most effectively assessed and evaluated by "authentic assessments" where the learner proves that he/she has developed the ability.
- We define abilities as more than just discrete skills. Instead, abilities are defined as the integration of Knowledge, Skills, and Attitudes that are necessary for success in work and life.
- As an instructor, it is important to know that you can use any existing behavioral objectives that you have already developed, if they are written from your student's perspective, focus on the expected learning, and are observable, and measurable.

http://www.rrc.ca/LearningOutcomeSupport/modules.asp?module=1&type=0&page=3

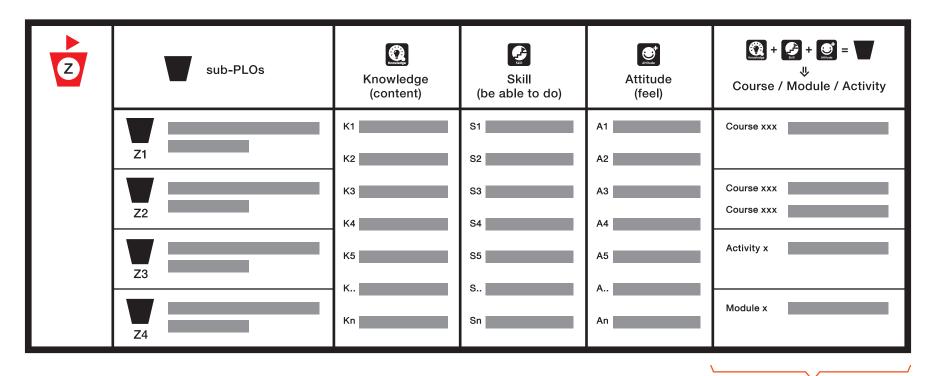
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PLO Breakdown and KSA Integration

Possible methods

Type A - Full version

(PLO Breakdown + KSA Integration)



Final lists of program element



2	sub-PLOs	Knowledge (content) (be able to do)	Carlor Attitude (feel)	tion for the second se
	Z1	Ki S1 K2 S2	A1 A2	Course xxx
	Z2	- ка 53 к4 54	Aa A4	Course xxx Course xxx
	Z3	95	A6	Activity x
	Z4	- К	A. An	Module x

Final lists of program element

Type C - KSA Integration

2	sub-PLOs	Knowledge (content)	Skill (be able to do)	Attitude (feel)	(i) + (i) + (i) = ↓ ↓ Course / Module / Activity
	-21	K1	S1	A1	K1 + K2 + S3 + S4 + A1 = TZ1 Course xxx
	22	K3	S3	A3	K3 + K5 + S1 + A5 = Course xxx Course xxx
	23	К5	S5	A5	K5 + S3 + A2 = ▼Z3 Activity x
		K	S	A	K2 + K7 + S2 + S5 + A4 = ¥Z4 Module x
				•	

Final lists of program element

Template Type A - Full version

Ŭ		sub-PLOs	Knowledge (content)	Skill (be able to do)	Attitude (feel)	Course / Module / Activity Final lists of program element
	•		K1	S1	A1	
						·····

8 | Structure and Sequence | **F**



Template Type B - PLO Breakdown

Ċ	sub-PLOs	Course / Module / Activity Final lists of program element
	 · · · · · · · · · · · · · · · · · · ·	
		·

Template Type C - KSA Integration

Ŭ	What are the specific things students will know at the end of the unit?	Skill (be able to do) What are specific things students should be able to do at the end of the unit?	What are specific attitudes students should have at the end of the unit?	Course / Module / Activity Final lists of program element
	<u>K1</u>	<u>S1</u>	<u>A1</u>	
		· ·····		



EXAMPLE Type B

	sub-PLOs	Course / Module / Activity Final lists of program element					
A1	A.1) A working knowledge of estimation techniques, rules of thumb, and engineering heuristics	Awareness; ME471; Design					
A2	A.2) An ability to appropriately interpret calculated results in the context of uncertainty (in the data, the models, the assumptions, or the analytical methods)	Competence; ME303; Design					
A3	A.3) An ability to solve common engineering problems, including problems involving						
A3-1	a. Linear system modeling and analysis of 1 DOF system responses due to free and forced input	Mastery; ME491; Mechanical Systems					
A3-2	b. The ability to model and simulate single-input single-output linear systems	Mastery; ME401; Mechanical Systems					
A3-3	c. The application of the first law of thermodynamics to the analysis of energy components and systems including at least one of the following: 1) Ideal Stirling and air standard power cycles, 2) Steam power plant components and systems, 3) Refrigeration and heat pump components and systems	Mastery; ME321; Thrmal Systems; PI					
A3-4	d. The application of the second law of thermodynamics to the analysis of energy components including 1) Steam and gas turbines and 2) Compressors and pumps	Competence; ME321; Thermal Systems					
A3-5	e. The application of the first law of thermodynamics to the design process	Competence; ME328; Thermal Systems					
A3-6	f. The selection of materials for mechanical components based on design considerations	Competence; ME304; Design					
A3-7	g. The selection of materials for mechanical components based on manufacturing issues	Competence; ME471; Design					
A3-8	h. The application of numerical techniques (of differentiation and integration) for simulating the behavior of engineering systems	Mastery; ET240/MATH344; Computers, programming and Simulation (Issue with examples - consider moving this to ME491)					
A3-9	i. The application of statistical analysis to manufacturing, including the computation of process capability and the understanding of statistical process control	Competence; ME314; Mfg & Materials					
A3-10	j. Kinematic/Dynamic analysis skills, including: 1) Analysis of position, velocity and acceleration kinematics of mechanisms, 2) Analysis of inverse dynamics of mechanisms, and 3) Basic analysis of cams and gears	Competence; ME301; Mechanical Systems					
 A 3-10 A 3-11 A 3-12 A 3-13 	k. The application of the fundamentals of fluid dynamics to the design process	Competence; CE340; Fundamentals & Service Courses					
A3-12	I. The application of the second law of thermodynamics to the design process	Competence; ME328; Thermal Systems					
A3-13	m. The application of the fundamentals of heat transfer in the analysis of thermal systems	Competence; ME412; Thermal Systems					
A3-14	n. Linear system modeling and analysis of 2 DOF system responses	Awareness; ME491; Mechanical Systems					

4 Structure and Sequence 8

EXAMPLE Type B

B	sub-PLOs	Course / Module / Activity Final lists of program element						
B	B.1) Written and graphical communication skills appropriate to the profession of engineering, including:							
B	a. Writing and editing clear and effective engineering design reports, including technical content that is factually correct, supported with evidence, explained with sufficient detail, and properly documented	Mastery; ME470/1/2; Design; PI						
B	b. Writing and editing clear and effective laboratory reports, including the creation of "professional quality" graphics for figures, tables, plots and charts.	<i>Mastery</i> ; <i>ME498/388</i> ; <i>Lab/Experimental Methods</i>						
B	c. An ability to synthesize a large project report in the form of abstracts and executive summaries.	Mastery; ME470/1/2; Design						
ctively	d. Technical communication skills, including an ability to explain the importance of organization, purpose, and target audience.	Competence; COMS103; Fundamentals & Service Courses						
effec	e. Documenting project work properly in a design notebook.	Competence; ME472; Design						
nicate (f. Documenting experimental data properly in a lab notebook or on lab data sheets.	Competence; ME398/388; Lab/Experimental Methods						
unu B	B.2) Oral and visual communication skills appropriate to the profession of engineering, including:							
	a. Preparing and making clear and effective formal presentations, including the preparation of "professional quality" visual aids.	Mastery; ME470/1/2; Design; PI						
liity t ∎	b. The ability to participate in technical discussions.	Competence; ME471; Design						
Graduates will demonstrate an ability to communicate effectively								





EXAMPLE Type B

C		sub-PLOs	Course / Module / Activity Final lists of program element				
	C1	c.1) Problem solving skills, including the ability to convert an open-ended problem statement into a statement of work and/or a set of design specifications.	Competence*; ME470**; Design***				
	C2	c.2) The ability to generate creative and feasible alternative solutions to open-ended design problems, using precedent, lessons learned, and methods such as brainstorming or functional block diagrams.	Competence; ME470; Design; PI				
Graduates will demonstrate an ability to design a system, component, or process to meet desired needs	СЗ	c.3) The ability to use common methods such as decision matrices for comparing alternatives and making engineering decisions.	Competence; ME470; Design				
	C4	c.4) The ability to apply engineering analysis (including load and stress analysis) for the design/sizing of mechanical components based on likely failure modes and meaningful factors of safety.	Mastery; ME303; Design				
	C5	c.5) The ability to select machine elements (such as bearings, gears, or fasteners) to satisfy specific functional requirements.	Competence; ME471; Design				
	C6	c.6) The ability to apply useful tools for design refinement such as value engineering, design for manufacturing and assembly (DFMA), or similar tools.	Competence; ME471; Design				
	C7	c.7) A recognition of various methods for managing risk and quantifying and improving system reliability, and an ability to apply failure modes and effects analysis (FMEA) in a design project.	Competence; ME471; Design				
	C8	c.8) An ability to deal with engineering standards and most of the following constraints in engineering design: economic, manufacturability, health and safety, environmental, sustainable, ethical, social, political.	Competence; ME470/1/2; Design; PI				
	C 9	c.9) The ability to apply general project management tools such as Gantt charts, Pareto charts, and critical path analysis for planning, prioritizing, and scheduling tasks in a design project.	Competence; ME470/1/2; Design				
will demonstrate an meet desired needs	C10	c.10) The ability to use basic manufacturing skills (such as machining, grinding and turning) and the ability to work with vendors / part suppliers to build and assemble prototypes of a product design.	Competence; ME472; Design				
onsi sire	C11	c.11) The ability to evaluate and use test results for design improvement and validation.	Competence; ME471/2; Design				
dem it de	C12	c.12) The ability to design, implement and evaluate controllers for linear systems.	Competence; ME401; Mechanical Systems				
will w mee	C13	c.13) The application of heat transfer to thermal design.	Awareness, ME412, Thermal Systems				
Graduates process to							

Program element aggregations

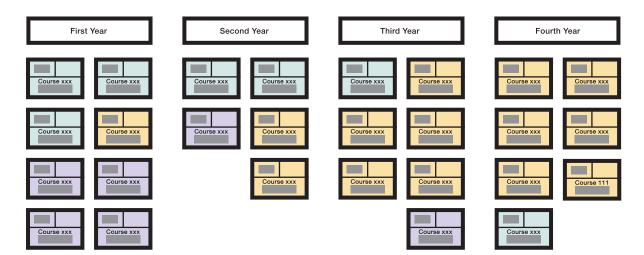
Once the final list of program elements is attained, a curriculum map can be used to provide an overview of the structure of the curriculum and the contribution of individual elements (e.g., courses) to the goals of the program. In addition, a program structure can also be viewed via a set of diagrams showing the sequences/relationships of the elements as depicted in the picture.

EXAMPLE

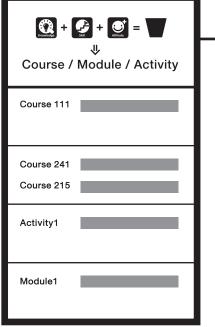
• A) Curriculum Mapping

Semester	Unit Courses	PLO A			PLO B				PLO C				PLO D				
		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Year 1/1	Course 111			х												х	
	Course 241								х					х			
	Course 215	х	х		х							х					
	Course 257			х													
	Activity 1	х													х		
	Course 211					х	x						х				

B) Program Structure



Final lists of program element



Curriculum mapping

What is it? Why do it?

Curriculum mapping is the process indexing or diagramming a curriculum to identify and address academic gaps, redundancies, and misalignments for purposes of improving the overall coherence of a course of study and, by extension, its effectiveness (a curriculum, in the sense that the term is typically used by educators, encompasses everything that teachers teach to students in a program or course, including the instructional materials and techniques they use).

The purpose of a curriculum map is to document the relationship between every component of the curriculum. Used as an analysis, communication, and planning tool, a curriculum map

- allows educators to review the curriculum to check for unnecessary redundancies, inconsistencies, misalignments, weaknesses, and gaps;
- documents the relationships between the required components of the curriculum and the intended student learning outcomes;
- helps identify opportunities for integration among disciplines;
- provides a review of assessment methods; and
- identifies what students have learned, allowing educators to focus on building on previous knowledge.

What you should think about

- Questions a Curriculum map can answer
- In the key courses, are all outcomes addressed, in a logical order?
- Do all the key courses address at least one outcome?
- Do multiple offerings of the same course address the same outcomes, at the same levels?
- **V** Do some outcomes get more coverage than others?
- Are all outcomes first introduced and then reinforced?
- Are students expected to show high levels of learning too early?
- ✓ Do students get practice on all the outcomes before being assessed, e.g., in the capstone?
- ✓ Do all students, regardless of which electives they choose, experience a coherent progression and coverage of all outcomes?
- What do your electives, individually and collectively, contribute to the achievement of your student learning outcomes?

Curriculum mapping template

Program:

Curriculum Mapping													
	Unit Courses	PLO A					PL	ОВ		PLO C			
Semester		Sup-PLO A1	Sup-PLO A2	Sup-PLO A3	Sup-PLO A4	Sup-PLO B1	Sup-PLO B2	Sup-PLO B3	Sup-PLO B4	Sup-PLO C1	Sup-PLO C2	Sup-PLO C3	Sup-PLO C4

% | Structure and Sequence | **A**

EXAN	IPLE
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Program name: Master of Mechanical Engineering

EXAMPLE of Curriculum mapping

Unit Courses		PLC) A:	ide	entify	, for	mula	ite, a	ınd s	olve	eng	inee	ring	prol	olem	s			D B: ectiv		imur	nicat	e		PLO C: design a system, component, or process to meet desired needs												
	A1	A2							ļ	43									E	31			E	32	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
			A3-1	A3-	-2 A3-3	3 A3-	4 A3-5	5 A3-6	6 A3-7	A3-8	A3-9	A3-10	A3-11	A3-12	A3-13	A3-14	B1-1	B1-2	B1-3	B1-4	B1-5	B1-6	B2-1	B2-2													
COMS103; Fundamentals- Service Courses																	с																				
ET240; Programming and Simulation																																					
ME301; Mechanical Systems		с																																			
ME321; Thermal System					м	с																															
ME314; Mfg & Materials											с																										
ME303; Design		С																										м									
ME328; Thermal Systems							с							с																							
ME304; Design								С																													
ME398/388; Lab/Experimental Methods																						с															
MATH344; Simulation										М																											
CE340; Fundamentals & Service Courses													с																								
ME471; Design	А								С															С					С	С	С				С		
ME470; Design																	м		м			М			с	с	С					С	С				
ME491; Mechanical Systems			м																																		
ME401; Mechanical Systems																															с						
ME412; Thermal Systems										с																						м					
ME491; Mechanical Systems											A																										
ME498/388; Lab/Experimental Methods			_															м																			
ME472; Design																С													С								

A = Awareness | C = Competence | M = Mastery

Additional Information

• Curriculum mapping

How is a curriculum map created? (I R M A method)

1. Faculty members begin with a) the program's intended student learning outcomes, b) recommended and required courses (including General Education courses if appropriate) and c) other required events/experiences (e.g., internships, department symposium, advising session, national licensure exams)

2. Create the "map" in the form of a table or others.

3. Mark the courses and events/experiences that currently address those outcomes

indicate students are introduced to the outcome



indicates the outcome is reinforced and students afforded opportunities to practice



indicates that students have had sufficient practice and can now demonstrate mastery



indicates where evidence might be collected and evaluated for program-level assessment (collection might occur at the beginning and end of the program if comparisons across years are desired)

4. Faculty members analyze the curriculum map. They discuss and revise so that each outcome is introduced, reinforced/practiced, and then mastered. In addition, each outcome should have an "A" to indicate that evidence can be collected for program-level assessment.

Source:

Education world. Curriculum Mapping / Curriculum Matrix; [cite 07062016]. Available from: https://manoa.hawaii.edu/assessment/howto/mapping.htm
 University of Hawaii. Curriculum mapping; [cite 07062016]. Available from: http://www.educationworld.com/a_curr/virtualwkshp/curriculum_mapping.shtml88



Other methods of Curriculum mapping

Example#1

English Program Outcomes Map Courses and Activities Mapped to English Program Outcomes

			Outo	ome		
	1. Engage in close reading: interpret textual details and ambiguities	2. Advance a proposition or thesis, supporting claims with explicit reasoning and textual evidence.	3. Compose analytical papers in cogent and coherent prose.	4. Place an argument in conversation with the ideas of other critics and theorists.	5. Formulate a research question and locate it within an interpretive context, such as aesthetic, cultural, & historical	6. Conduct research: find, evaluate and cite secondary sources, using accurate MLA style conventions
Courses and Learning Activities						
ENG 101 Composition		I				
ENG 102 English Composition & Literature	I	I	I	I	I	
ENG 203 The Child as Expressed in the Novel	R		R	R		
ENG 209 English Composition & Research Writing		I	I	I	I	I
ENG 212 Online Research Methods		R	R	R	R	R
ENG 306 American Literature: Late 19th and 20th Centuries	R	R	R	R		R
ENG 314 Women Writers: 18th Century Lives and Works	R	R	R	R		R
ENG 318 Avenues to Children's Literacy	R	R	R	R		R
ENG 379 Multicultural Science Fiction	R	R	R	R		R
ENG 401 Advanced Creative Writing	R	R	R	R	R	R
ENG 421 Poetry	R					
ENG 499 Writing Internship						
Legend: I Introduced	R Reinforced	D Demonstrat	ed M Mastered	Show Out	tcome Descriptions 🗍 🧲 St	how Course/Activity Detail

Source: www1:taskstream (curriculum Maps and the Optional Path) taskstream

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Example#2

CENTRAL GENERIC THEOLOGICAL SEMINARY Curriculum Map: Program Goals

	1. Art	iculate a	call				n basic m	inisteri	al skills		3. Inte	grate ski	ills and	apply ir	n minister	rial sett	ing			
Courses	1A	1B	1C	2A	2B	2C	2D	2E	2F	2G	3A	3B	3C	3D	3E	3F	3G	ЗH		KEYS
BIBLICAL STUDIES																				Code Key:
B1070 Models of Biblical Interpretation																			н	High correlation or primary focus
B1080 Topics in Biblical Interpretation																			М	Moderate correlation or secondary focus
B1091 Biblical Interpretation in the Church I																			L	Low correlation, tertiary, or weak focus
B1092 Biblical Interpretation in the Church II																			(blank)	Not addressed, absent, or does not apply
B1111/2 Intro Old Testament I & II																				
B1118 Humor in the Bible																				
B1121/2 Intro Biblical Hebrew I & II																			Deg	ree Program Goals:
B1123 Hebrew Readings																				to ministry, understood as a process of nework of spiritual and ministerial formation
B1125 Sin																			discerninent within the man	
B1135 Judges																			1A. Articulate a call t	o ministry.
B1142 Jeremiah																			1B. Understand the p	process of discernment.
B1153 The Megilloth																			1C. Give evidence of	spiritual and ministerial formation
B1511/2 Intro New Testament I & II																				nisterial skills: biblical, historical, theological , preaching, worship, leadership, and general
B1521/2 NT Greek I & II																			written and oral communica	
B1531 The Gospel of John																			2A. Demonstrate com	petence in biblical interpretation
B1532 Greek Readings in Acts																			2B. Demonstrate com interpretation	petence in historical and theological
B1533 Acts (Eng)																				petence in pastoral care
B1537 Greek Readings in the Gospel of Mark																			2D. Demonstrate com	petence in preaching
B1579 Women and New Testament Narratives																			2E. Demonstrate com	petence in worship leadership
B1580 Christian Preaching about Jews and Judaism																			2F. Demonstrate com	petence in pastoral leadership
HISTORICAL THEOLOGICAL STUDIES																			2G. Demonstrate com	petence in oral and written communication
HT2111 Introduction to the Christian Tradition I & II																				kills listed in the previous goals and apply them
HT2120 Creativity and Imagination: Women Leaders in Church																			to specific ministerial setting	35
HT2123 Classics of Christian Literature																			3A. Demonstrate ability to	integrate program goals
HT2125 Prayer in the Spirituality of the Ancient Church																			3B. Applies skill in biblical in	nterpretation in specific ministerial settings
HT2140 Christianity and the Rise of Islam																			3C. Applies skill in historical settings	and theological interpretation in ministerial
HT2141 Monastic Roots in the Radical Reformation																				care in specific ministerial setting
HT2160 The Baptist Heritage																			3E. Applies skill in preaching	g in specific ministerial setting
HT2162 Church and State																			3F. Applies skill in worship l	eadership in specific ministerial setting
HT2311/2 Christian Theology I & II																			3G. Applies skill in pastoral	leadership in specific ministerial setting
HT2313 Theology of the Church																			3H. Applies skill in oral and	written communication in ministerial setting
HT2341 Theology from an African Perspective																			DIRECTIONS:	
HT2345 Third World Theologies																				the strength of each degree program goal for
HT2410 Introduction to Christian Ethics																				Consult the professor, review the course syllabus, objectives, identify course methodologies, and
HT2410 Christianity and Culture																			review course descriptions	for overt evidence of each goal. If there is no
HT2453 Anxious About Empire				\square															overt evidence of a goal, or the box blank.	if the goal does not apply to the course, leave
HT2510 Philosophy of Religion																			Che Sox Diality.	

HT2510 Philosophy of Religion Copyright © 2013, Israel Galindo



Example#3 Different types of Curriculum maps

I) Basic Curriculum Mapping

					Curricu	lum Mappin	g						
			PL	D A			PL	ОВ			PL	oc	
Semester	Unit Courses	Sup-PLO A1	Sup-PLO A2	Sup-PLO A3	Sup-PLO A4	Sup-PLO B1	Sup-PLO B2	Sup-PLO B3	Sup-PLO B4	Sup-PLO C1	Sup-PLO C2	Sup-PLO C3	Sup-PLO C4
	Course for All Majors												
	Course 1XX Title		Х				Х	Х		Х			Х
	Course 1XX Title	X			Х	Х					Х		
	Course 2XX Title		Х	Х					Х			Х	Х
	Module XXX Title	X		Х				Х	Х	Х		Х	
	Activity XXX Title	X	Х						Х		Х	Х	Х

II) Skill Level Curriculum Mapping

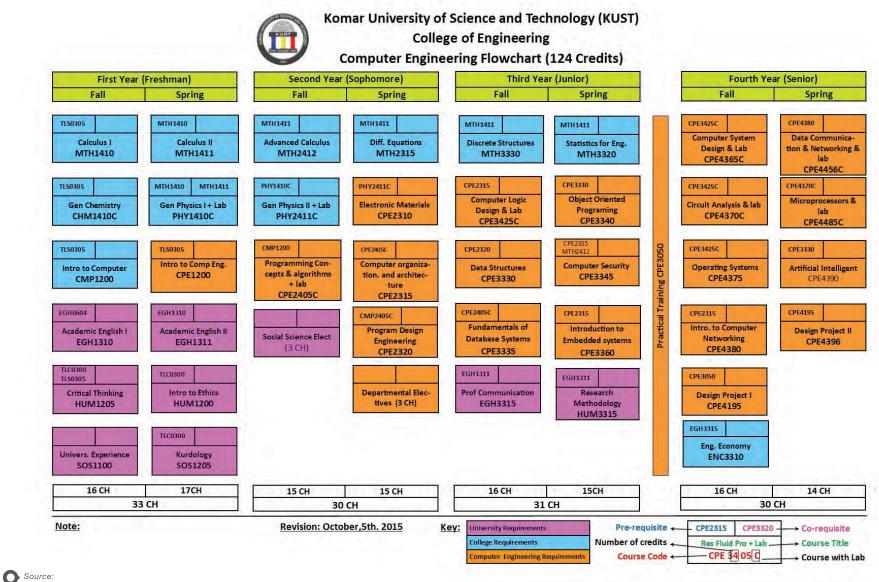
					Curricul	um Mappin	g						
			PL	O A			PLO	ЭΒ			PL	oc	
Semester	Unit Courses	Sup-PLO A1	Sup-PLO A2	Sup-PLO A3	Sup-PLO A4	Sup-PLO B1	Sup-PLO B2	Sup-PLO B3	Sup-PLO B4	Sup-PLO C1	Sup-PLO C2	Sup-PLO C3	Sup-PLO C4
	Course for All Majors												
	Course 1XX Title		I				I	R		I			Ι
	Course 1XX Title	I			R	R					Ι		
	Course 2XX Title		R	R					М			R	М
	Module XXX Title	I		I				I	R	I		I	
	Activity XXX Title	I	R						R		R	I	М

III) Activity & Assessment Curriculum Mapping

					Curricul	um Mappin	g						
			PL	ΟΑ			PL	ОВ			PL	ос	
Semester	Unit Courses	Sup-PLO A1	Sup-PLO A2	Sup-PLO A3	Sup-PLO A4	Sup-PLO B1	Sup-PLO B2	Sup-PLO B3	Sup-PLO B4	Sup-PLO C1	Sup-PLO C2	Sup-PLO C3	Sup-PLO C4
	Course for All Majors												
	Course 1XX Title		Essay				Class Presentation	Exam Questions		Group Progect			Essay
	Course 1XX Title	Exam Questions			Class Presentation	Discussion Section					Essay		
	Course 2XX Title		Essay	Exam Questions					Class Presentation			Group Progect	Essay
	Module XXX Title	Discussion Section		Essay					Class Presentation	Group Progect		Essay	
	Activity XXX Title	Discussion Section	Exam Questions									Essay	

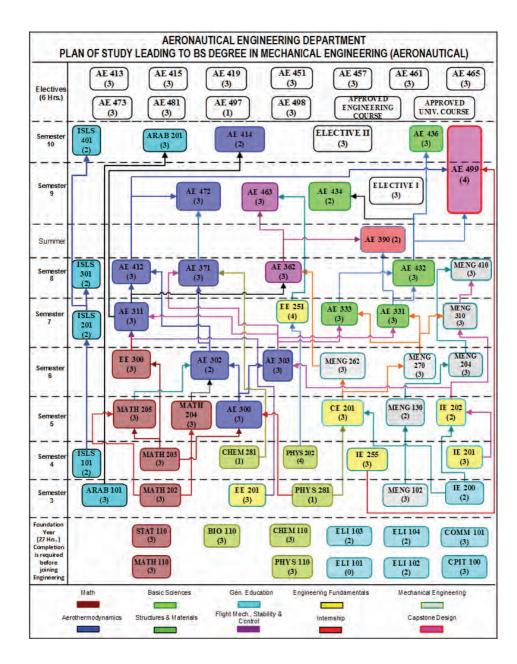
• Program structure and sequence

Example#1



http://cpe.komar.edu.ig/prospective-students/study-plan-flowchart

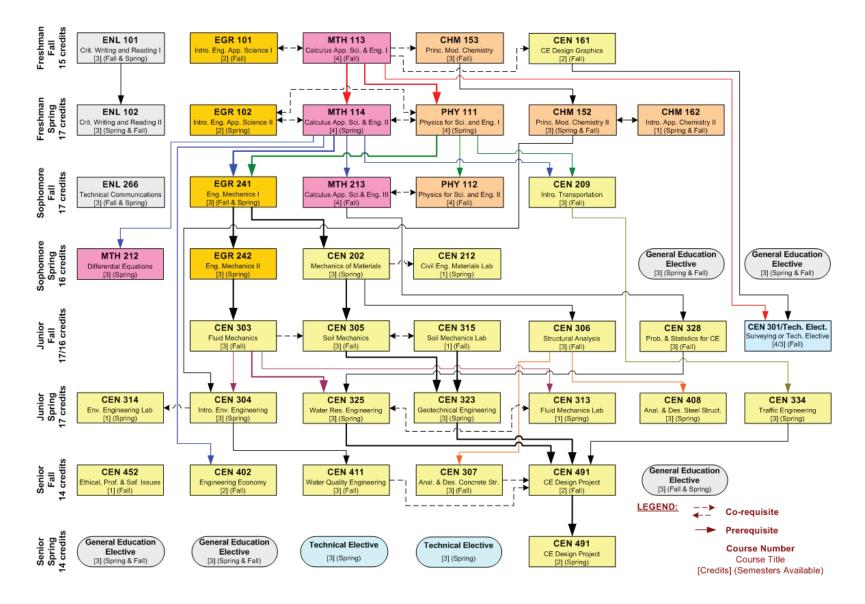




◄ | Structure and Sequence | 5

Source: ae.kau.edu.sa [King Abdulaziz university]

Example#3



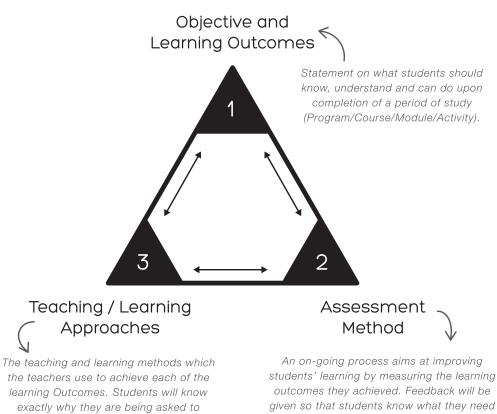
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Constructive Alignment

OBE: constructive alignment

Biggs (2003) defines constructive alignment as: The 'constructive' aspect refers to what the learner does, which is to construct meaning through relevant learning activities. The 'alignment' aspect refers to what the teacher does, which is to set up a learning environment that supports the learning activities appropriate to achieving the desired learning outcomes. The key is that the components in the teaching system, especially the teaching methods used and the assessment tasks are aligned to the learning activities assumed in the intended outcomes. The learner is 'trapped', and cannot escape without learning what is intended. In simple terms constructive alignment means that all assessment tasks, and learning and teaching experiences (and therefore content and methods) must be linked to the desired unit of study learning outcomes.

In order to ensure that your learning design is sound, your learning outcomes should be in line with the assessment that you are using to test for the achievement of learning outcomes. In addition, both learning outcomes and assessment should be aligned with the teaching method. We can imagine the relationship between these these three concepts forms a triangle; consequently it is often referred to as the "Triangle of effective learning".



engage in certain teaching and learning

activities in their courses.

to do in order to get better grades.

4 Steps: Designing Constructively Aligned Teaching and Assessment

Step 1: Describe intended outcomes in the form of standards students are to attain using appropriate learning verbs.

Step 2: Create a learning environment likely to bring about the intended outcomes.

Step 3: Use assessment tasks enabling you to judge if and how well students' performances meet the outcomes.

Step 4: Develop grading criteria for judging the quality of student performance.



Assessment method

Student assessment is one of the most important elements of higher education. The outcomes of such assessment have a profound effect on students' future careers. It is therefore important that assessment is carried out professionally at all times and takes into account the extensive knowledge that exists on testing and examination processes. Assessment also provides valuable information for institutions about the efficiency of teaching and learner support. Student assessment is expected to:

- be designed to measure the achievement of the expected learning outcomes;
- be fit for purpose, whether diagnostic, formative or summative; have clear and published grading and marking criteria;
- take account of all the possible consequences of examination regulations; absence, illness and other mitigating circumstances;
- ensure that assessment is conducted securely in accordance with the institution's stated procedures;
- be undertaken by people who understand the role of assessment in the students' progression towards achieving the knowledge and skills associated with their intended qualification; where possible, not relying on the evaluation of one single examiner;
- be subjected to administrative verification in ensuring the effectiveness of the procedures.
- inform students about the assessment being used for their programme, what examinations or other assessment methods they will be subjected to, what will be expected of them, and the criteria that will be applied to the assessment of their performance.

? Diagnostic questions

For each PLO, could you identify assessment strategies/scheme/standards you'd like to provide as and explicit guidelines for consistent assessment practices of teachers across the program.

- Is entry assessment done on new students?
- Is exit assessment done on departing (graduating) students?
- To what extent do the assessment and examinations cover the content of the courses and programme? To what extent do the assessment and examinations cover the objectives of the courses and of the programme as a whole?
- Is the assessment criterion-referenced?
- Is a variety of assessment methods used? What are they?
- Are the pass/fail criteria clear?
- Are the assessment/examination regulations clear?
- Are any safeguards in place to ensure objectivity?
- Are the students satisfied with the procedures? What about complaints from students?
- Do clear rules exist for re-assessment and are students satisfied with these?
 A special form of student assessment is the final project (dissertation, thesis or project). This requires students to demonstrate their knowledge and skills and their ability to manipulate the knowledge in a new situation.
- Do clear regulations exist for the final project?
- What criteria have been formulated to assess the final project?
- What does the preparation for producing the final project involve (in terms of content, methods, and skills)?
- Is the level of the final project satisfactory?
- Do any bottlenecks exist for producing final project? If so, why?
- How are students being coached?

What you should think about

- 1. Assessment covers: New student admission Continuous assessment during the course of study Final/exit test before graduation
- In fostering constructive alignment, a variety of assessment methods should be adopted and be congruent with the expected learning outcomes. They should measure the achievement of all the expected learning outcomes of the programme and its courses.
- 3. A range of assessment methods is used in a planned manner to serve diagnostic, formative, and summative purposes.
- The student assessments including timelines, methods, regulations, weight distribution, rubrics and grading should be explicit and communicated to all concerned.
- 5. Standards applied in assessment schemes are explicit and consistent across the programme.
- Procedures and methods are applied to ensure that student assessment is valid, reliable and fairly administered.
- 7. The reliability and validity of assessment methods should be documented and regularly evaluated and new assessment methods are developed and tested.
- 8. Students have ready access to reasonable appeal procedures.
- 9. How often are you planning to assess the achievement of each PLO in your program?

Additional Information

• Example of assessment methods

Projects

Individual or small-group projects that enable teachers to assess students' ability to apply acquired knowledge and skills. Students demonstrate skill level such as problem solving ability in solving authentic, real world tasks or challenge based task without a predetermined solution.

Skills demonstration

Students physically presents learning; demonstrate skill level and problem solving ability in relevant contexts.

Role play

Students take on roles to simulate a problem solving. Practical – replicating "real world" skills as much as possible.

Observation

Observer assesses behavior in a natural setting or simulated professional practice. Assessment criteria are set in advance.

Reflective journal

Reflective journals encourage students to reflect critically on the process of learning and their development over time. It may describe events, experiences or issues associated with learning, professional placement, fieldwork, or the like; may be included in a portfolio as a record of student learning.

Oral presentation

Students (individual or group) verbally present their learning; dealing with

preparation and planning to communicate through effective speaking. Oral presentation could be used with recorded elements of audio and video tapes made by students. Also, encourage students to develop oral skills by assessing through discussions or seminars.

Self assessment

Students respond in writing to criteria set for evaluating their learning using critical reflection; can be used in conjunction with other methods such as a rubric or focus questions.

Peer assessment

Peer assessment allows team members to assess other members of the team as well as themselves; allow the students to gain experience with giving and receiving feedback and give them an opportunity to improve performance before it counts against their grades. Peer assessment provides data that might be used in assigning individual grades for team assignments.

Work product (from employment, internship, service learning) Work sample is provided by the students.

Exhibition

Visible, public demonstrations of mastery; a showcase of students' work products and learning. A well-structured exhibition often depends on a student-directed classroom.

Field report

Form of assessment that requires observation, recording, and organization skill when take a field study or participate in a special seminar, etc.

Written exam - Short answer

Provide short answers to questions or complete sentences. Test student ability to organize, compose and write rather than merely recognize or recall.

Written exam - Essay

The form of a piece of writing specially composed by the student to respond a question or topic set by the teacher or any topic which requires the ability to construct and sustain a written argument, usually within a set word-limit.

Written exam - Standardized exam

Exam designed in a way that the questions, conditions for administering, scoring procedures, and interpretations are consistent and are administered and scored in a predetermined, standard manner; often designed by using multiple choices questions and true or false format.

Written exam - Matching

Students select a second statement that best complements with each presented statement.

Written exam - Fill-in-the-blank

Students complete phrases or sentences by filling in the blanks.

Oral exam - Structured/ structured, semi-structured, open-ended oral examinations

Students respond to preset questions (and answers).

Oral exam - One to one interview

A face to face interview during which questions may flow from students'

responses; allows for a more complete assessment than pre-set questions; is useful in combination with portfolio assessment.

Oral exam - Panel interview

Students are interviewed by several examiners.

Assignments/ Homework

a piece of assignment required to be done prior or after class to develop a certain set of technical or soft skills.

Dissertation/thesis

A dissertation advancing an original point of view as a result of research/ a hypothetical proposition. This assessment can be used to measure a variety of thinking, communication, and other skills.

Focus group

Group interview with a set of specially designed questions to measure their understanding of a topic or to evaluate a certain set of skills.

Student surveys

Self evaluation completed by the students.

360 Degree assessment

multi-source assessment which includes (but not limited to) a variety of assessment methods such as self evaluation, peer evaluation, user feedback, instructor response/comment, etc.

Simulation

Students perform in a simulated real life situation; providing controlled sample of real life and work activity; involves students in application and integration of knowledge and skill.

Teaching learning approaches

The teaching and learning approach is often dictated by the educational philosophy of the university. Educational philosophy can be defined as a set of related beliefs that influences what and how students should be taught. It defines the purpose of education, the roles of teachers and students, and what should be taught and by what methods.

Quality learning is understood as involving the active construction of meaning by the student, and not just something that is imparted by the teacher. It is a deep approach of learning that seeks to make meaning and achieve understanding.

Quality learning is also largely dependent on the approach that the learner takes when learning. This in turn is dependent on the concepts that the learner holds of learning, what he or she knows about his or her own learning, and the strategies she or he chooses to use.

Quality learning embraces the principles of learning. Students learn best in a relaxed, supportive, and cooperative learning environment.

- In promoting responsibility in learning, teachers should:
- create a teaching-learning environment that enables individuals to participate responsibly in the learning process; and
- provide curricula that are flexible and enable learners to make meaningful choices in terms of subject content, programme routes, approaches to assessment and modes and duration of study.

The teaching and learning approach should promote learning, learning how to learn and instil in students a commitment of lifelong learning (e.g. commitment to critical inquiry, information-processing skills, a willingness to experiment with new ideas and practices, etc.).

? Diagnostic questions

For each PLO, could you identify teaching and learning strategies/scheme/standards you'd like to provide as and explicit guidelines for consistent T&L practices for teachers across the program.

- Are the teaching and learning methods used aligned with the expected learning outcomes?
- How is technology used in teaching and learning?
- How is the teaching and learning approach evaluated? Do the chosen methods fit into the learning outcomes of the courses? Is there sufficient variety in the methods?
- Is practical training a compulsory or optional part of the program?
- How many credits are allocated to these activities?
- Is the level of the practical training and/or community service satisfactory?
- What benefits do communities gain from the service provided by the program?
- What benefits do employers and students gain from the practical training?
- Are there any bottlenecks in the practical training? If so, what causes them?
- How are students being coached?
- How is the assessment done?

What you should think about

- The teaching and learning approach is often dictated by the educational philosophy of the university. Educational philosophy can be defined as a set of related beliefs that influences what and how students should be taught. It defines the purpose of education, the roles of teachers and students, and what should be taught and by what methods.
- 2. Quality learning is understood as involving the active construction of meaning by the student, and not just something that is imparted by the teacher. It is a deep approach of learning that seeks to make meaning and achieve understanding.
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- 4. Quality learning embraces the principles of learning. Students learn best in a relaxed, supportive, and cooperative learning environment.
- 5. In promoting responsibility in learning, teachers should: a) create a teaching-learning environment that enables individuals to participate responsibly in the learning process; and b) provide curricula that are flexible and enable learners to make meaningful choices in terms of subject content, programme routes, approaches to assessment and modes and duration of study.
- 6. The teaching and learning approach should promote learning, learning how to learn and instill in students a commitment of lifelong learning (e.g. commitment to critical inquiry, informatio-processing skills, a willingness to experiment with new ideas and practices, etc.).

Additional Information

• Examples of teaching methods

Lecture

Giving lecture by the instructor or guest speaker, usually to a large number of students. Opportunities for discussion are generally limited.

Large Group Discussion

Engage students in large group / whole class discussions. Require students to reflect on information presented or examine their personal beliefs or conclusions about a specific topic or issue.

Small Group Discussion

Foster active participation and steer participants in small group toward constructive activities and dialogue. Students debates their various points of views regarding the issues covered in the course. Specific small group techniques such as seminar, roundtables, and dialogue facilitation, etc)

Tutorial group

Offer a small number of students the materials presented during lectures in more depth: including space for discussion and queries.

Seminar

Bringing together small groups for recurring meetings, focusing each time on some particular subject, in which everyone present is requested to actively participate. Assigned readings are discussed, questions can be raised and debated. Students are more extensively with the methodology of their chosen subject or allowed to interact with examples of the practical problems that always occur during research work.

Deductive / direct instruction

Present a general concept by first defining it and then providing examples or illustrations. Students practice with instructor guidance and feedback, applying and finding examples of the concept at hands.

Inductive / discovery teaching or inquiry teaching

To expose students to a concrete instance of a concept. Students are asked to continually develop and test hypotheses in order to generalize a principle.

Case study

Learning about a complex instance, emphasize cases that incorporate real-world experiences contributing to the solution of problems.

Fieldwork

Provide the students with the opportunity to develop a deeper or different set of skills and competencies by doing in an environment outside the class. The focus is on applying acquired knowledge in real life situations - linking what is learnt in class with what is seen, collected, and tested in the field.

Field trip / excursion

Taking students outside the classroom setting to have first hand- experience or real life situation.

Learning Center

To provide a broad array of enrichment activities that can complement their regular academic programs during non-school hours.

Dramatization

To adopt the dramatic form in according to the given situation or issue. Define roles and set the scenario, students 's knowledge and understanding is reflected through the adopted character.

Game

Use game as a means for learning. By setting a set of clear rules, students are subjected to encompass an element of competition. Normally, the game tends to have winners and losers. prescriptive. Also, actions are programmed and structured.

Simulation

Involves students in application and integration of knowledge and skill. By representing real environments which change over time, students are to react and adapt to real world situation. Free from the competitive element but need to proceed in a particular order.

Role Playing

Individual students are to place themselves in the position of another or as themselves and deal with unfamiliar circumstances going on around them. A given situation clearly defined to simulate real world environment. Note that role playing has an element of game and simulation and could have winners and losers.

Structured/Traditional/Cookbook Laboratory

The laboratory is set of clearly defined steps that closely guide the students through an experimental procedure.

Unstructured Laboratory Programmed Instruction/ Computer Assisted Instruction: CAI /Online Instruction

Students are expected to develop inquiry skill, apply concepts learned in class to new situations rather than following lab direction. Instructors and students might work together as a research team to proceed the experiment.

Practice

To supervise the students in practical application of a previously studied theory.

Research-based instruction

To incorporate the research results to individual or group research projects or classroom assignments.

Problem-based instruction

Engage students through the process of solving a problem - design task to engage students in solving authentic, ill-structured, open ended and cross-disciplinary problems. Engage students in the exploration of multiple solution paths, key decision points and trade-offs.

Project-based instruction

Give projects and activities that require students to work in small collaborative groups to complete complex tasks that typically result in a realistic product based on their understanding and application of knowledge. Aso, focus on a constructive investigation that involves inquiry and knowledge building.

Inquiry-based instruction

Give key subject matter concepts-balancing direct instruction with inquiry opportunities, require students to investigate multiple subjects in order to generate a workable solution focusing on questioning, critical thinking, and problem solving.

Reflective thinking

Motivate students to share the interest of the subject or reflect on their experience, value questioning, hypothesizing, and openness to new ideas and perspectives. To coach student teams critique one another's work.



Independent study

Enable students to meet personal learning objectives students through a self study align with their theme of interest.

Resource person

Having the resource person - an expert with specialized knowledge - to explain certain topics to the students. The resource person could be individuals within the community who have good knowledge or adequate information on particular topics either as professional or through practical experience.

Micro teaching (in teacher education)

Provide students an opportunity to develop instructional skills - small groups of peers (videotape) observe each other teaching, provide feedback, and engage in discussion.

Supervision

To monitor and evaluation of a student performance by a supervisor.

Consult

Give an advice to individual students in both the particular area of expertise or general subjects.

Work-Integrated Learning

Integrate learning with industry, bridge between the University and the external community and professional practice at workplace, giving students more projects that mirror professional practice.

Self-directed learning

Students are responsible and determine what they need to learn. Instructors act as facilitators or tutors who prompt students to learn.

Brainstorming

With a variety of small group members, students openly collaborate to generate ideas on a specific issue in a given time limit. Normally, the key of brainstorming is to build on each others ideas creatively and avoid criticizing rather than determining which idea or ideas is the best solution.

Apprenticeship

Occupational training in a professional field that combines on-the-job experience with classroom instruction. Extend students' experience to real industry or business workplace.

Active Learning

Method of learning where active student participation is encouraged through project-based exercises. One unique characteristic of active learning is that the teacher acts as a facilitator of the education process rather than as a unilateral source of information.

Teaching Strategies to Help Promote Critical Thinking

The 1995, Volume 22, issue 1, of the journal, Teaching of Psychology, is devoted to the teaching critical thinking. Most of the strategies included in this section come from the various articles that compose this issue.

- CATS (Classroom Assessment Techniques): Angelo stresses the use of ongoing classroom assessment as a way to monitor and facilitate students' critical thinking. An example of a CAT is to ask students to write a "Minute Paper" responding to questions such as "What was the most important thing you learned in today's class? What question related to this session remains uppermost in your mind?" The teacher selects some of the papers and prepares responses for the next class meeting.
- Cooperative Learning Strategies: Cooper (1995) argues that putting students in group learning situations is the best way to foster critical thinking. "In properly structured cooperative learning environments, students perform more of the active, critical thinking with continuous support and feedback from other students and the teacher" (p. 8).
- Case Study /Discussion Method: McDade (1995) describes this method as the teacher presenting a case (or story) to the class without a conclusion. Using prepared questions, the teacher then leads students through a discussion, allowing students to construct a conclusion for the case.
- Using Questions: King (1995) identifies ways of using questions in the classroom:
- Reciprocal Peer Questioning: Following lecture, the teacher displays a list of question stems (such as, "What are the strengths and weaknesses of...). Students must write questions about the lecture material. In small groups, the students ask each other the questions. Then, the whole class discusses some of the questions from each small group.
- Reader's Questions: Require students to write questions on assigned reading and turn them in at the beginning of class. Select a few of the questions as the impetus for class discussion.

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• Conference Style Learning: The teacher does not "teach" the class in the sense of lecturing. The teacher is a facilitator of a conference. Students must thoroughly read all required material before class. Assigned readings should be in the zone of proximal development. That is, readings should be able to be understood by students, but also challenging. The class consists of the students asking questions of each other and discussing these questions. The teacher does not remain passive, but rather, helps "direct and mold discussions by posing strategic questions and helping students build on each others' ideas" (Underwood & Wald, 1995, p. 18).

- Use Writing Assignments: Wade sees the use of writing as fundamental to developing critical thinking skills. "With written assignments, an instructor can encourage the development of dialectic reasoning by requiring students to argue both [or more] sides of an issue" (p. 24).
- Dialogues: Robertson and Rane-Szostak (1996) identify two methods of stimulating useful discussions in the classroom:
 - Written dialogues: Give students written dialogues to analyze. In small groups, students must identify the different viewpoints of each participant in the dialogue. Must look for biases, presence or exclusion of important evidence, alternative interpretations, misstatement of facts, and errors in reasoning. Each group must decide which view is the most reasonable. After coming to a conclusion, each group acts out their dialogue and explains their analysis of it.
 - Spontaneous Group Dialogue: One group of students are assigned roles to play in a discussion (such as leader, information giver, opinion seeker, and disagreer). Four observer groups are formed with the functions of determining what roles are being played by whom, identifying biases and errors in thinking, evaluating reasoning skills, and examining ethical implications of the content.
- Ambiguity: Strohm & Baukus advocate producing much ambiguity in the classroom. Don't give students clear cut material. Give them conflicting information that they must think their way through.

Source:

- King, A. (1995). Designing the instructional process to enhance critical thinking across the curriculum: Inquiring minds really do want to know: Using questioning to teach critical thinking. Teaching of Psychology, 22 (1), 13-17.
- Robertson, J. F. & Rane-Szostak, D. (1996). Using dialogues to develop critical thinking skills: A practical approach. Journal of Adolescent & Adult Literacy, 39(7), 552-556.
- Underwood, M. K., & Wald, R. L. (1995). Conference-style learning: A method for fostering critical thinking with heart. Teaching Psychology, 22(1), 17-21.
- Cooper, J. L. (1995). Cooperative learning and critical thinking. Teaching of Psychology, 22(1), 7-8.
- McDade, S. A. (1995). Case study pedagogy to advance critical thinking. Teaching Psychology, 22(1), 9-10.
- http://www.utc.edu/walker-center-teaching-learning/teaching-resources/ct-ps.php

Constructive alignment template (Program Level)

Ŭ	Assessment Method	Teaching/learning approaches	
▼			
			Year 4
			Year 3
			Year 2
			Year 1



EXAMPLE#1

Y	At the end of this program graduates will be able to evalues implications, conclusions, and consequences of engineering solutions to global, economic, environmental, and societal context
¥1	Clearly identifies and summarizes main issues and successfully explains why/how they are problems or questions; and identifies embedded or implicit issues, addressing their relationships to each other.
¥2	Correctly apply all the empirical and most of the theoretical contexts relevant theoretical contexts relevant to all the main stakeholders in the situation.
¥3	Construct a clear and precise personal point of view concerning the issue, and seriously discusses its weaknesses as well as its strengths and acknowl- edges objections and rival positions and provides convincing replies to these.
¥4	evaluates all the important assumptions and some of the more hidden, more abstract ones.
¥5	rigorously evaluates all important evidence offered and provides new data or information for consideration.
¥6	Identifies and thoroughly discusses implications, conclusions, and consequences, considering all relevant assumptions, contexts, data, and evidence.

	Assessment Method	Teaching/learning approaches	
Y6	presentation, written test, debate, mocked court, critical writing/essay, experiment, project, performance test, case studies.	problem based learning, experiment, project based learning, peer teaching, case studies.	Year 4
Y4 Y5	essay writing, poster, written report, portfolios, presentation, case studies, critiques, situation.	case study, group project, laboratory experiment, field work, problem based learning, debate, concept formulation.	Year 3
Y2 Y3	demonstration, problem solving, field trip, experiment, show&tell, mix&match, role play, case study, group project, projects, presentation, posters, field work, work assignment	concept formulation (e.g., mind map, tree diagram) context discussion, medel	Year 2
Y1	Short answer test, written test, practical test, tutorials, mix and match, presentation (reciting, summarising).	Explicit teaching, lecture, didactic questions, demonstration drill and practice, role play, modelling, simulation, puzzles, rub out and remember, multi-media, computer based training.	Year 1



EXAMPLE#2

Z	AT the end of this program graduates will be able to apply knowledge of mathematics.
Z1	Recognizes functional relationships among independent and dependent variables and describes physical significance of functions, derivatives of functions, and integrals of functions
Z2	Explains the role of mathematics as a tool for modeling systems and processes.
Z3	Applies mathematical principles to obtain analytical or numerical solution to model equations and chooses a mathematical model of a system or process appropriate for the required accuracy.
Z4	Identifies mathematical and physical assumptions that allow model to be developed and solved at the level of accuracy required and apply concepts of integral and differential calculus and linear algebra to solve problems.

Assessment Method	Teaching/learning approaches	
 Classify concepts, examples, or phenomena into correct categories. Summarize different types of thinking strategies. Use types of thinking strategies to analyze and evaluate their own thinking. Practice choosing the best type of thinking strategy to use in different real-world situations and explaining why their choice is superior. Detect and identify flaws and fallacies in thinking. Identify and explain instances of open- and closed-mindedness. Identify and explain instances of responsible versus irresponsible and accurate versus inaccurate applications of thinking strategies. Answer questions that require persistence in discovering and analyzing data or information 	 Point out the important and the unimportant features or ideas. Point out examples and nonexamples of a concept, highlighting similarities and differences. Give a wide range of examples, increasing their complexity over time. Emphasize the relationships among concepts. Explain different types of thinking strategies, including how to think open-mindedly, responsibly, and accurately. Emphasize persistence when answers are not apparent. Ask students questions that require their persistence in discovering and analyzing data or information. Encourage students to self-evaluate and reflect on their learning. Ask questions that make students explain why they are doing what they are doing. Explain and model how to conduct systematic inquiry, detect flaws and fallacies in thinking, and adjust patterns of thinking. 	Year 4
 1- Generate new examples and nonexamples. Paraphrase the procedures, principles, rules, and steps for using or applying the material. Practice applying the material to problems or situations to gain speed, consistency, and ease in following the problem-solving steps. Practice choosing the types of problem-solving strategies for different situations. Solve simple, structured problems, then complex, unstructured ones. 2- Practice recognizing the correct use of procedures, principles, rules, and steps with routine problems, then complex ones. Demonstrate the correct use of procedures, principles, rules, and steps with routine problems, then complex ones. 	 Give multiple examples of a phenomenon that are meaningful to students. Define the procedures for use, including the rules, principles, and steps. Provide the vocabulary and concepts related to procedures. Explain steps as they are applied. Define the contexts, problems, situations, or goals for which given procedures are appropriate. Explain the reasons that procedures work for different types of situations or goals. Ensure students' readiness by diagnosing and strengthening their command of related concepts, rules, and decision-making skills. Provide broad problem-solving methods and models. Begin with simple, highly structured problems; then gradually move to more complex, less structured ones. Use questions to guide student thinking about problem components, goals, and issues. Give students guidance in observing and gathering information, asking appropriate questions, and generating solutions. 	Year 3
 Restate or paraphrase and summarize information or knowledge. Describe or explain phenomena or concepts using words different from those used in the initial teaching. Identify the correct meaning of concepts or terms. Add details or explanations to basic content. 	 Outline new or upcoming material in simple form. Concept-map or mind-map new or upcoming material. Explain with concrete examples, metaphors, questions, or visual representations. 	Year 2
 Relate new to previously learned content. Construct visual representations of main ideas (mind or concept maps, tables, flowcharts, graphs, diagrams, or pictures). 		Year 1



Constructive alignment template (Course Level)

Course:

 \bigtriangleup \triangle **Course Learning Outcome** Teaching/learning approaches **Assessment Method**

CLO1:			
	·		
CL02:			
CLO3:			
	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	

Plan B

* Please note, a 'Plan B' If this method is not working well for your students, what would you do?

EXAMPLE

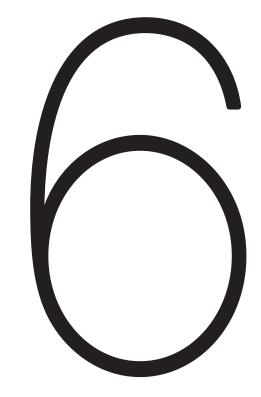


Course: Project ma

Project management

Course Learning Outcome	Assessment Method	Teaching/learning approaches	Plan B
CLO1: Construct a simple work breakdown structure(WBS).	Learners are given a project scenario, which they then construct a simple WBS for. Learner passes if the WBS submitted: - identifies all tasks necessary to complete project - breaks tasks and activities down into manageable activities structures activities in a logical sequence	Practical workshop in which learners construct a simple WBS for a number of different scenarios.	
CLO2:			
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Program Specification

Program specification

Program specification is a set of documents that describes the study program offered by the university. The program specification usually encompasses the following items:

- a summary of program aims and intended outcomes;
- an outline of the course structure;
- a matrix showing how the program learning outcomes are achieved through the courses; and
- a set of course specifications

The program specification serves:

- as a source of information for students and potential students seeking to understand a program;
- as a source of information for employers, particularly on the knowledge and transferable skills developed by the program;
- professional and statutory regulatory bodies that accredit higher education programs which can lead to entry into a profession or other regulated occupations. Program specification should identify those aspects of the program that are designed to meet the requirements of the relevant bodies;
- institutional and teaching teams to promote discussion and reflection on new and existing programs and to ensure
 that there is common understanding on the expected learning outcomes of the program. Program specification
 should enable institutions to satisfy themselves that the designers of the program are clear about their expected
 learning outcomes and that these outcomes can be achieved and demonstrated. Program specification can serve
 as a reference point for internal review and monitoring of a program's performance;
- as a source of information for academic reviewers and external examiners who need to understand the aim and intended outcomes of a program; and
- as a basis for gaining feedback from students or recent graduates on the extent to which they perceived the opportunities for learning to be successful in promoting the intended outcomes.

The information to be included in the program specification is listed below.

- Awarding body/institution
- Teaching institution (if different)
- Details of the accreditation by a professional or statutory body
- Name of the final award
- Program title
- Expected Learning outcomes of the program
- Admission criteria or requirements to the program
- Relevant subject benchmark statements and other external and internal reference points used to provide information on program outcomes
- Program structure and requirements including levels, courses, credits, etc.
- Date on which the program specification was written or revised

The information to be included in the course specification is listed below.

- Course title
- Course requirements such as pre-requisite to register for the course, credits, etc.
- Expected learning outcomes of the course in terms of knowledge, skills and attitudes
- Teaching, learning and assessment methods to enable outcomes to be achieved and demonstrated
- · Course description and outline or syllabus
- Details of student assessment
- Date on which the course specification was written or revised.

? Diagnostic questions

- Are the expected learning outcomes translated into the program and its courses?
- What information is documented in the program and course specifications?
- Is the course specification standardised across the program?
- Is the program specification published and made available or known to stakeholders?
- What is the process for reviewing the program and course specifications?

What you should think about

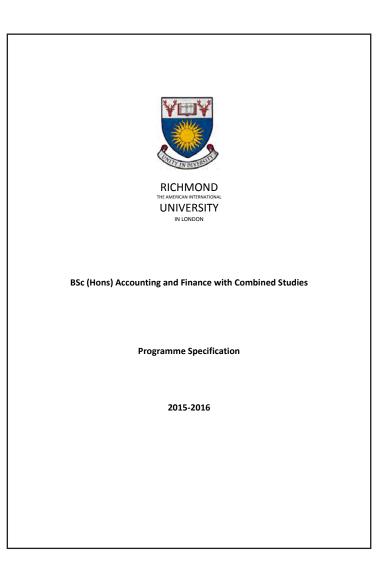
- The Institution is recommended to publish and communicate the program and course specifications for each program it offers, and give detailed information about the program to help stakeholders make an informed choice about the program.
- Program specification including course specifications describes the expected learning outcomes in terms of knowledge, skills and attitudes. They help students to understand the teaching and learning methods that enable the outcome to be achieved; the assessment methods that enable achievement to be demonstrated; and the relationship of the program and its study elements.
- The information in the program/course specification is comprehensive and up-to-date.

Additional Information

 Program Specification (2015–1016) of BSc (Hons) Accounting and Finance with Combined Studies RICHMOND UNIVERSITY.

http://www.richmond.ac.uk/wp-content/uploads/2015/07/PS-BSc-Accounting-and-Finance-2015-16.pdf

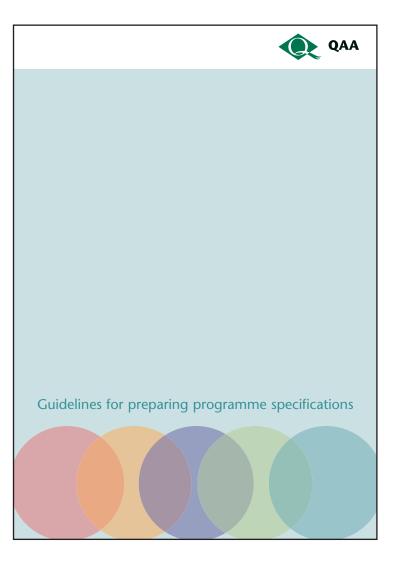




• Guidelines for preparing program specifications

http://www.qaa.ac.uk/en/Publications/Documents/Guidelines-for-preparing-programme-specifications.pdf





Curriculum Development & Outcome monitoring tools

What is LE.

Learning Environment (LE) is the KMUTT's learning and teaching system created to provide the functionality specifically customized for KMUTT's outcome-based education. The system offers a unified point of access to a complete suite of web-based learning resources, activities, assessment, engagement tools and other related services that drive KMUTT education to reform towards a truly outcome-based education environment. Therefore, LE let you focus your energy on what you need to do for your student learning since it can support Program-level Learning Outcome design, curriculum mapping, course's constructive alignment planning, and monitoring of students outcome development process.

How would LE help you.

- 1. LE is an integrated outcome-based learning system so it's designed to support the PLO breakdown: the alignment of your curriculum and your course planning. You can put your PLO, sub-PLO, and CLO in the system and let LE do the work of an outcome development monitoring
- In LE, lesson plan is tied tightly to course learning outcomes to identify how each learning activity and its assessment contribute to the learning outcome of the course and ultimately to the collective goal of the curriculum. This means that we can always know exactly where to improve.
- 3. In LE, you can create and edit lesson plan anytime. You could revise your initial class lesson plan as required during the semester. Try put down your class experiences and ideas to our 'improvement suggestion' list and it will show up again when you have to do the next round of lesson planning.
- 4. It provides a summative view of outcome status for each student (yes, individually), so you would be able to view the status of outcome development from the perspective of your class or your curriculum anytime.
- 5. It offers a simple set of KMUTT rubrics and KMUTT's CLO database, which can be useful as templates for your assessment design.
- 6. Courses in LE are created automatically every semester based on KMUTT enrollment information as we always want to make sure that LE is ready for you when you need it.

What you need to do to get LE working for you.

- 1. Make sure you have a KMUTT login
- 2. Get to know LE
 - a. go to http://www.myle.kmutt.ac.th/training
 - b. read LE simple instructions based on your role. Eg, a curriculum designer or a teacher.
- 3. Talk to your curriculum designers if the information on your curriculum PLOs, Sub-PLOs, and CLOs of your program is ready. If yes, login and give it a go!
- 4. If you need to add teachers as your curriculum designers or change their roles,

please contact our team through myle@mail.kmutt.ac.th

Frequently asked questions

- 1. Who can use LE? everyone with KMUTT account. You can ask for an account from the computer centre www.cc.kmutt.ac.th
- 2. If my curriculum does not have PLO/Sub-PLO information yet, can I use LE? Yes! You can use LE to design a lesson plan, engage with your students or monitor their learning development with or without an alignment to your curriculum outcome.

Visit us at: www.myle.kmutt.ac.th

LECD - What is LECD.

Learning Environment Curriculum Design tool (LECD) is a curriculum design tool that will help you plan, view and visualise the relationships between many elements of your curriculum. Like LE, LECD is based on Outcome Based Education (OBE) design principle. Thus it would require you to think about Program-level Learning Outcomes (PLOs) and the constructive alignment of your program elements. LECD is tailored to KMUTT and thus it also provides linkages from your program to KMUTT's competence list.

This tool is designed to support curriculum designers for all steps of curriculum design starting from creating a new curriculum, recording PLOs/Sub-PLOs, aligning PLOs/Sub-PLOs with KMUTT's competencies, identifying the linkages between PLOs/Sub-PLOs and your courses, as well as letting your colleagues help you plan Course Learning Outcomes (CLOs) collaboratively. It also generates a real-time curriculum mapping showing the alignment of your curriculum design so you can adjust the design as you go.

LECD is now ready. Try it now: http://lecd.myle.kmutt.ac.th/

CONTACT US



myle@mail.kmutt.ac.th

VISIT US



www.myle.kmutt.ac.th

TRY IT NOW





Further Assistance

Now that you've completed your curriculum design guide, it's time to move forward with implementing any changes you may have made to your curriculum and courses. The following checklist should guide you with reflection on the steps you might take to pursue your professional development needs.

Collaborative partnerships

Use this checklist to help you decide which departments, if any, you should contact for assistance.

Center for Excellence Development in Education; C4ED (Call 8238)	Yes	No
- Do you have suggestions/feedback about this guide book?	Ο	Ο
- Do you require assistances in exploring new educational development ideas?	0	0
KMUTT Learning Environment; LE (Call 8475)	Yes	No
- Do you require training in LE?	0	Ο
- Do you want to use LE to help you track PLO and CLO of your program?	0	0
Education Technology Development and Service; ETS (Call 8478)	Yes	No
 Do you require training in any of the educational technology you identified in your instructional strategies section? 	Ο	Ο
Center for Effective Learning and Teaching; CELT (Call 8383)	Yes	Νο
- Do you require training in learning outcome and related topics?	0	Ο
 Do you require training in any of the teaching strategies or formative feedback you identified? 	Ο	Ο
- Do you require training in authentic assessment strategies?	0	0
Office of Educational Development and Service; EDS (Call 8152)	Yes	No
- Do you have any questions about process's for approval of <u>new program</u> by Academic council, University council and/or Office of the Higher Education Commission?	Ο	Ο
- Do you have any questions about process's for periodic review of a program by Academic		

Contact us



Center for Excellence Development in Education (C4ED)

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