

Curriculum Revision Based on OBE Framework and AUN-QA Criteria

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Intended Learning Outcomes

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Curriculum Revision based on OBE Framework and AUN-QA Criteria: Development and Implementation

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

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Workshop:

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- E1: Formulating Expected Learning Outcomes (ELOs)
- E2: Backward design curriculum
- E3: Construct a programme structure and curriculum map
- E3: Formulation of course learning outcomes (CLOs)

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What is outcome-based education?

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Outcome-based education (OBE)

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

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

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OBE Model

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“Product (ELOs) defines process (SCL)”

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

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

SCL: “Student-Centered-Learning”

OBE Concept

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Expected Learning Outcomes

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

Student-Centered Learning

Learning Activities

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

Assessments

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

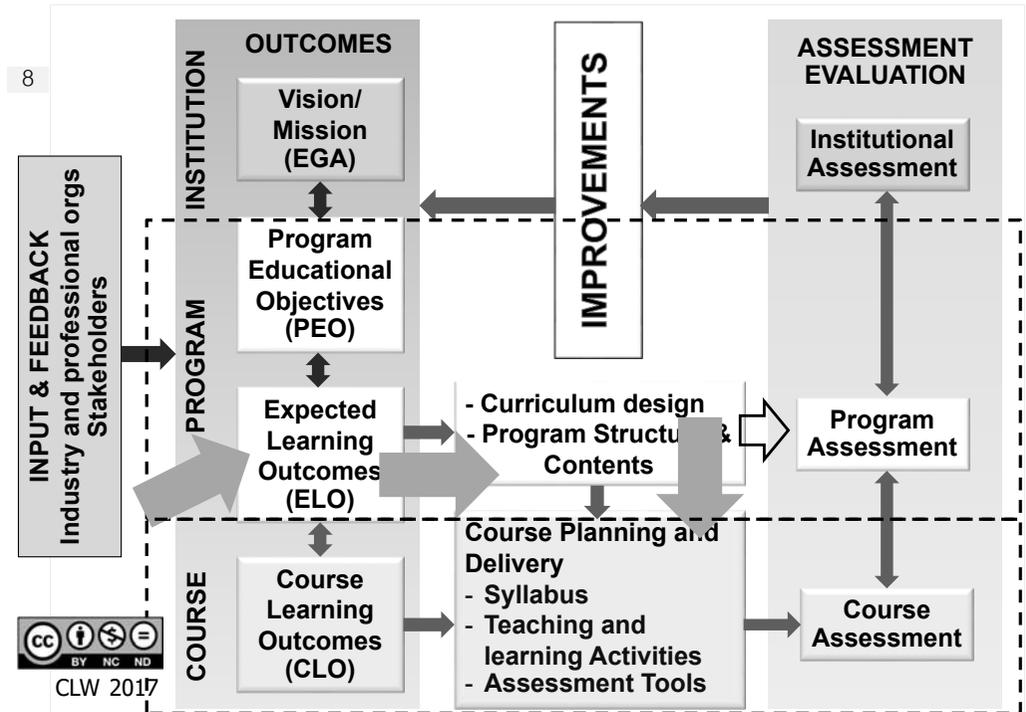
Key Concepts and Principles of OBE

7

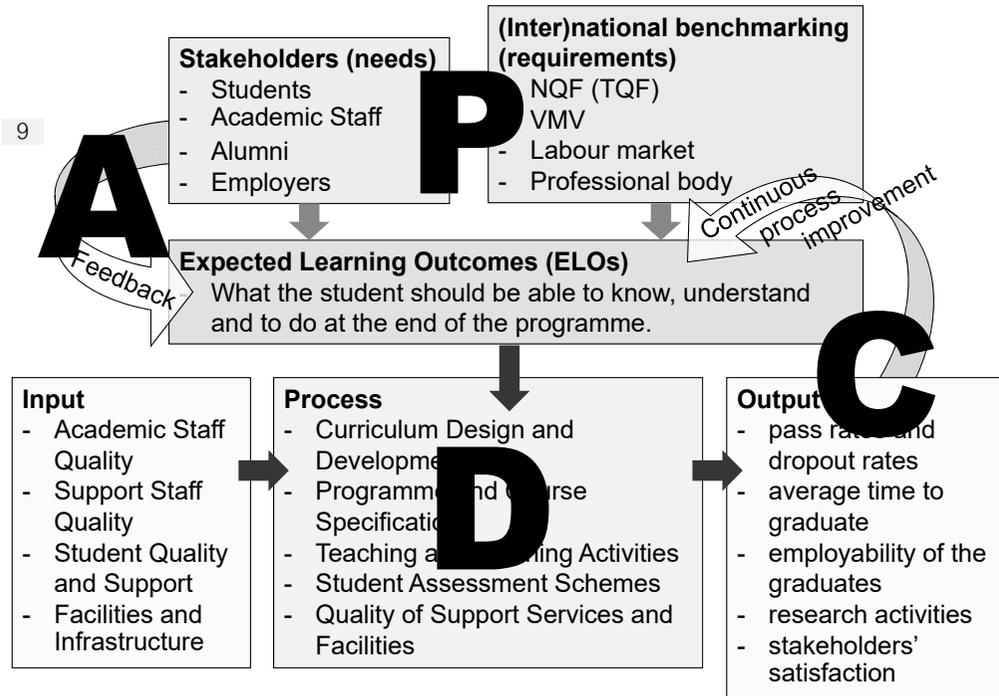
- **Focus on results of learning (ELOs)**
- **Backwards curriculum design** - design down (from the performances expected of graduates) and deliver up.
- **Create learning opportunities** to help different learners achieve learning outcomes
- **Constructive alignment** (assessment – learning activities – learning outcomes)

An OBE Model

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AUN-QA Model at Programme Level

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- Design based on OBE Framework
- PDCA Approach to Assessment
- Principles-based assessment system designed for Improvement to Best practice

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Guide to AUN Actual Quality Assessment at Programme Level (3rd Version, 2015)

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- Criteria and assessment process of AUN Actual Quality Assessment at Programme Level
- Associated resources (templates and samples)
- 3rd version will be effective from January 2017

http://www.aunsec.org/pdf/Guide%20to%20AUN-QA%20Assessment%20at%20Programme%20Level%20Version%203_2015.pdf

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Criteria

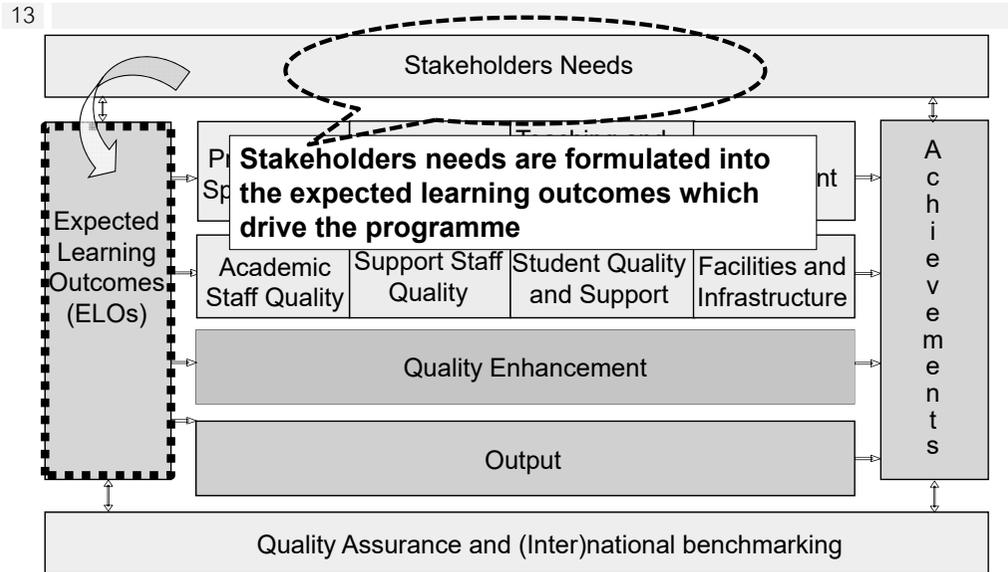
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1. Expected Learning Outcomes
2. Programme Specification
3. Programme Structure and Content
4. Teaching and Learning Approach
5. Student Assessment
6. Academic Staff Quality
7. Support Staff Quality
8. Student Quality and Support
9. Facilities and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

017



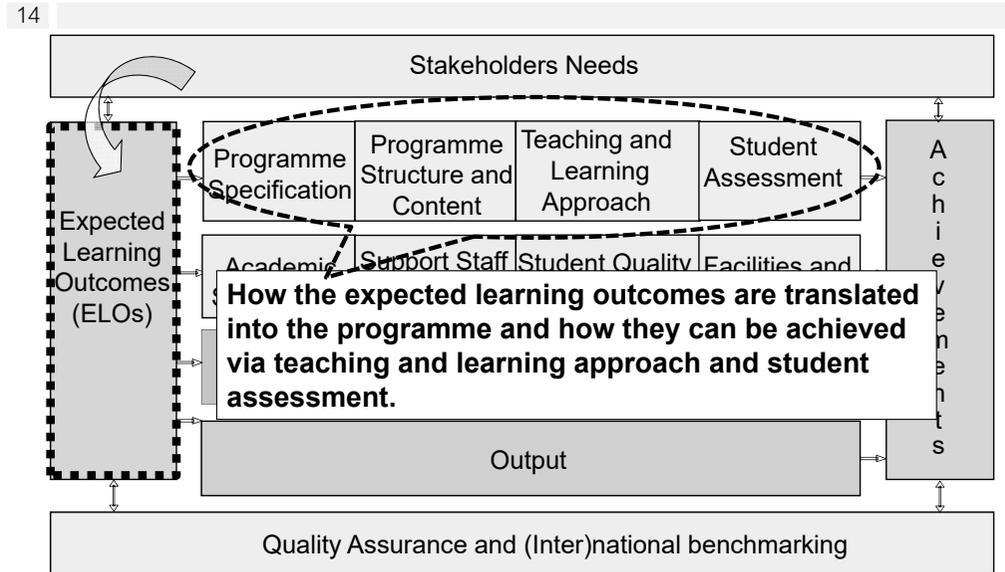
Started with Expected Learning Outcomes



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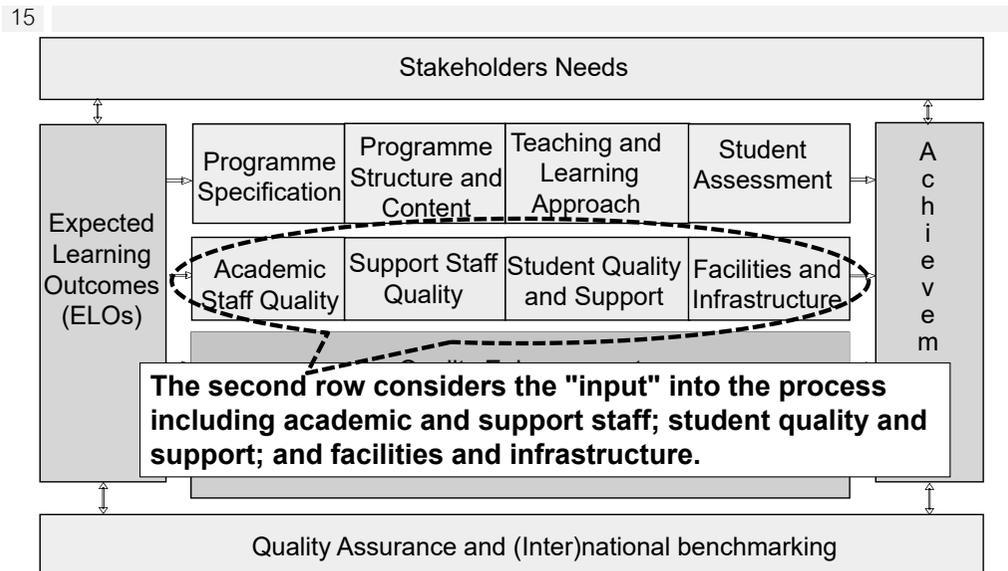
The first row



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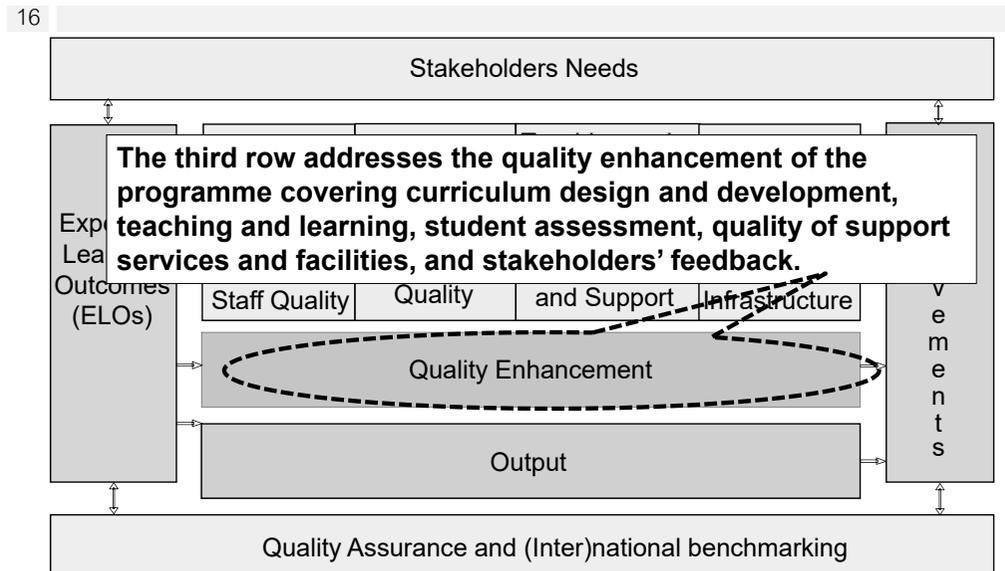
The second row



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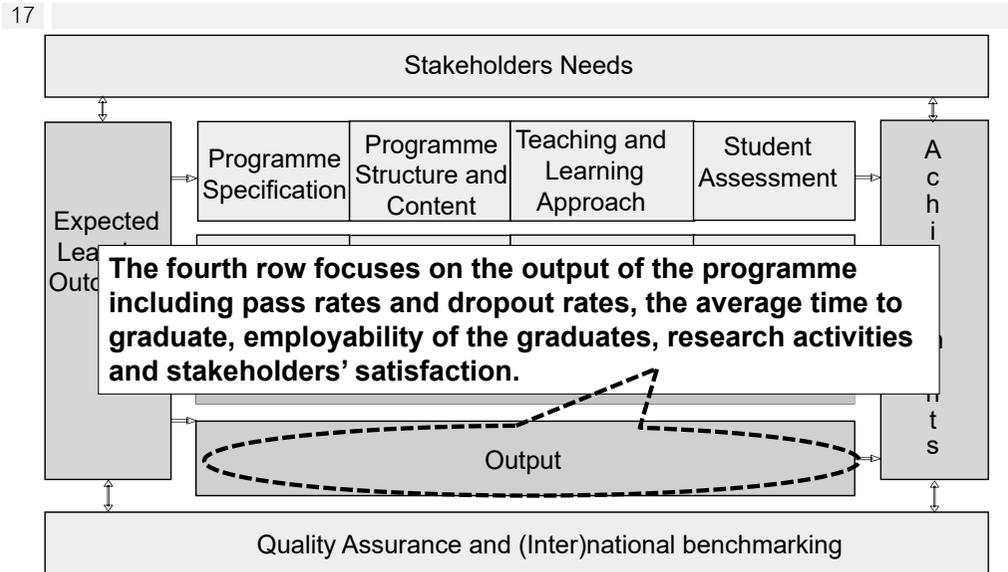
Third row



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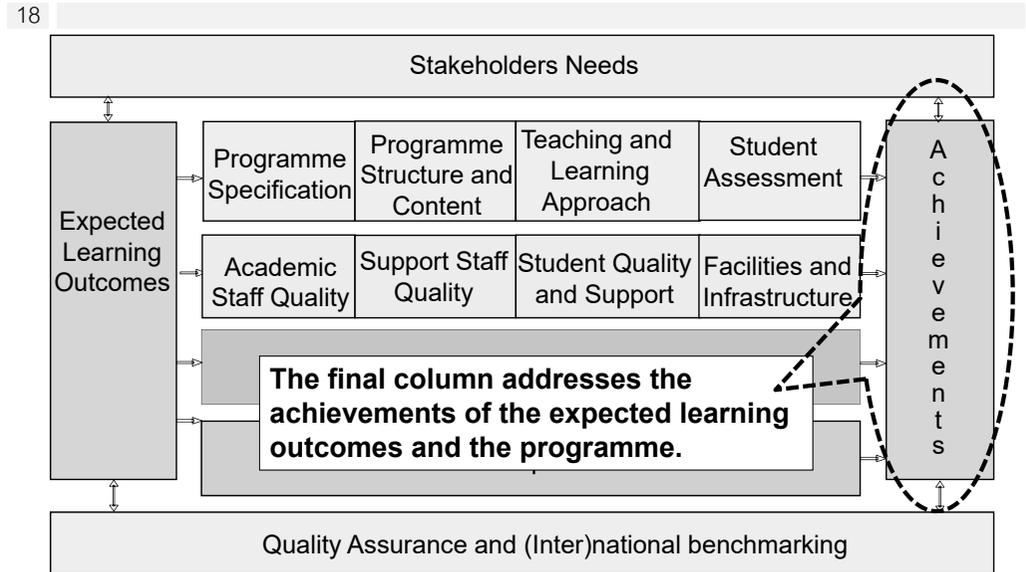
The fourth row



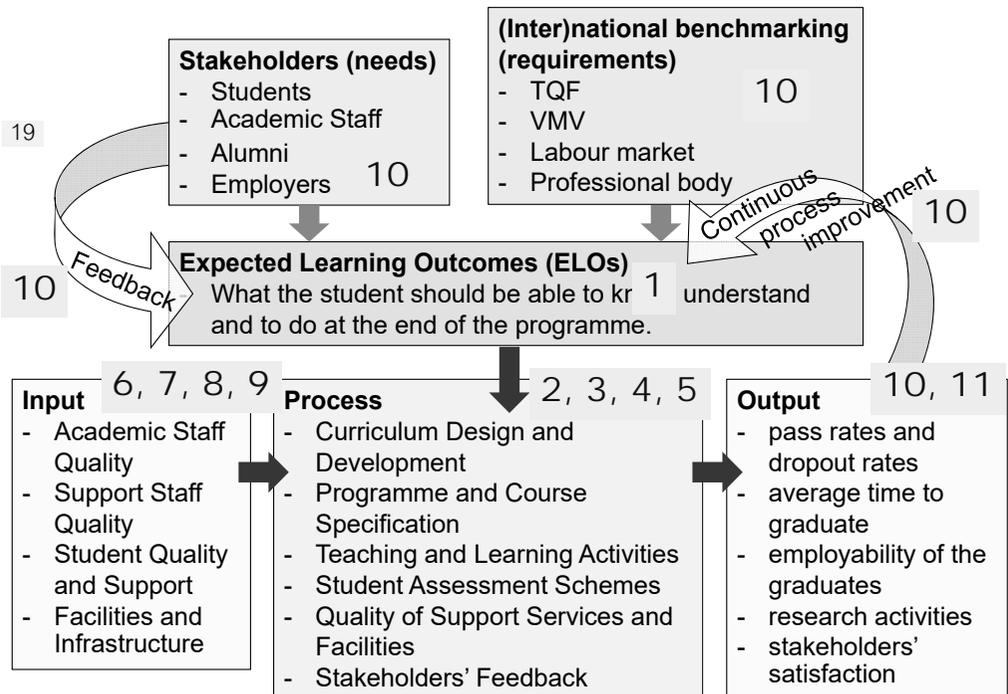
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The final column



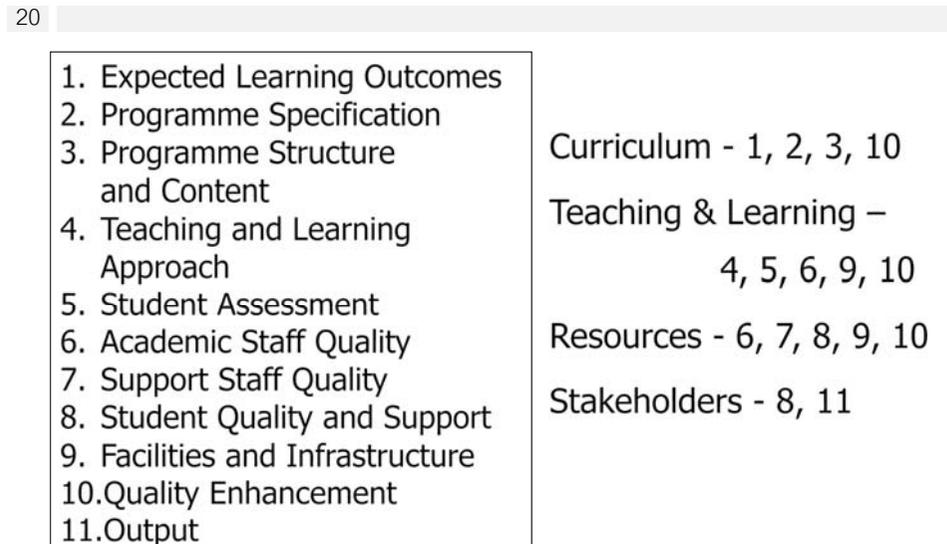
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Relationship of Criteria and Tasks



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Five steps in a curriculum design based on OBE

5 Basic steps in a curriculum design based on OBE

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

How to formulate Expected Learning Outcomes (ELOs)?

Learning Outcomes for HE Students

Reginal Level → AQRF → 3 domains, 8 level
National level → NQF → 3 domains, 8 levels
National/International Accreditation Requirements

- **University level → GAs**
What are the attributes of an ideal graduate of the University?
- **Programme level → ELOs, ILOs, SLOs**
What are the intended learning outcomes for students enrolled in the programme?
- **Course/Subject/Module/Unit level**
What are the intended learning outcomes for students taking a particular course/subject/module/unit at a particular level within the programme?

Others Name of Learning Outcomes

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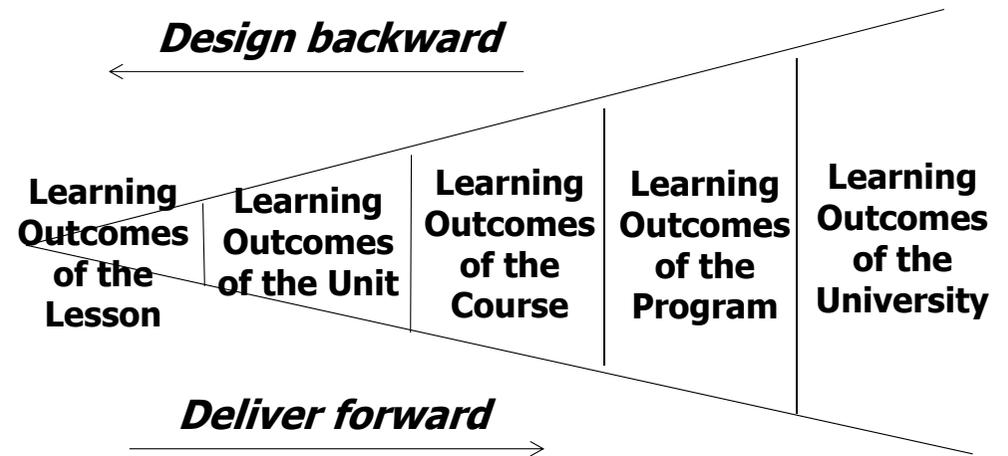
- At a programme level
 - Student Learning Outcomes, SLOs (USA)
 - Expected Learning Outcomes, ELOs (AUN)
 - Intended Learning Outcomes, ILOs
- Programme Learning Outcomes, PLOs
- At a course level
 - Course Learning Outcomes, CLOs
 - Course Intended Learning Outcomes, CILOs

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Designing and Delivering Learning Outcomes

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Expected learning outcomes

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- The ELO (Student Learning Outcomes) is the starting point of the Curriculum design and improvement.
- ELO is what the student should be able **to know**, **understand** and **to do** at the end of the programme.
- EOLs should be formulated from the requirements of the stakeholders.
- ELOs should be written in a way where learning is translated into observable and measurable **results** which can be **demonstrated and assessed**.

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Learning Outcomes (EQF 2008)

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

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

Thailand NQF, 2017TQF - V2

- Align with AQRF
(ASEAN Qualification Reference Framework)
- 3 Domains of Learning Outcomes
 - (1) Knowledge
 - (2) Skills
 - (3) Application and Responsibility
- 8 Educational Levels

ASEAN Qualifications Reference Framework, AQRF

<http://asean.org/storage/2017/03/ED-02-ASEAN-Qualifications-Reference-Framework-January-2016.pdf>

- The AQRF is based on broad level descriptors (2 domains) which include eight levels of complexity of learning outcomes.
- The level descriptors include the **notion of competence**, which is the ability that extends beyond the possession of knowledge and skills. It includes:
 - *Cognitive competence*
 - *Functional competence* (skills or know-how)
 - *Personal competence*
 - *Ethical competence*

AQRF

<http://asean.org/storage/2017/03/ED-02-ASEAN-Qualifications-Reference-Framework-January-2016.pdf>

The **level descriptors** include two domains

- Knowledge and Skills
- Application and Responsibility

The Knowledge and Skills domain includes the various kinds of knowledge such as facts and theories as well as the skills used, such as practical and cognitive skills.

The Application and Responsibility domain defines the context in which the knowledge and skills are used in practice as well as the level of independence including the capacity to make decisions and the responsibility for oneself and others.

Knowledge and Skills	Application and Responsibility	
<i>Demonstration of knowledge and skills that:</i>	<i>The contexts in which knowledge and skills are demonstrated:</i>	
Level 8	<ul style="list-style-type: none"> is at the most advanced and specialised level and at the frontier of a field involve independent and original thinking and research, resulting in the creation of new knowledge or practice 	<ul style="list-style-type: none"> are highly specialised and complex involving the development and testing of new theories and new solutions to resolve complex, abstract issues require authoritative and expert judgment in management of research or an organisation and significant responsibility for extending professional knowledge and practice and creation of new ideas and or processes.
Level 7	<ul style="list-style-type: none"> is at the forefront of a field and show mastery of a body of knowledge involve critical and independent thinking as the basis for research to extend or redefine knowledge or practice 	<ul style="list-style-type: none"> are complex and unpredictable and involve the development and testing of innovative solutions to resolve issues require expert judgment and significant responsibility for professional knowledge, practice and management
Level 6	<ul style="list-style-type: none"> is specialised technical and theoretical within a specific field involve critical and analytical thinking 	<ul style="list-style-type: none"> are complex and changing require initiative and adaptability as well as strategies to improve activities and to solve complex and abstract issues

Learning Outcomes of Bachelor Degree specified in AQF

Australian Qualifications Framework Second Edition January 2013
<https://www.aqf.edu.au/sites/aqf/files/aqf-2nd-edition-january-2013.pdf>

AQF level 7 criteria

Summary	Graduates at this level will have broad and coherent knowledge and skills for professional work and/or further learning
Knowledge	Graduates at this level will have broad and coherent theoretical and technical knowledge with depth in one or more disciplines or areas of practice
Skills	Graduates at this level will have well-developed cognitive, technical and communication skills to select and apply methods and technologies to: <ul style="list-style-type: none"> analyse and evaluate information to complete a range of activities analyse, generate and transmit solutions to unpredictable and sometimes complex problems transmit knowledge, skills and ideas to others
Application of knowledge and skills	Graduates at this level will apply knowledge and skills to demonstrate autonomy, well-developed judgement and responsibility: <ul style="list-style-type: none"> in contexts that require self-directed work and learning within broad parameters to provide specialist advice and functions

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Bachelor Degree qualification type descriptors

Bachelor Degree qualification type descriptor

Purpose	The Bachelor Degree qualifies individuals who apply a broad and coherent body of knowledge in a range of contexts to undertake professional work and as a pathway for further learning
Knowledge	Graduates of a Bachelor Degree will have a broad and coherent body of knowledge, with depth in the underlying principles and concepts in one or more disciplines as a basis for independent lifelong learning
Skills	Graduates of a Bachelor Degree will have: <ul style="list-style-type: none"> cognitive skills to review critically, analyse, consolidate and synthesise knowledge cognitive and technical skills to demonstrate a broad understanding of knowledge with depth in some areas cognitive and creative skills to exercise critical thinking and judgement in identifying and solving problems with intellectual independence communication skills to present a clear, coherent and independent exposition of knowledge and ideas
Application of knowledge and skills	Graduates of a Bachelor Degree will demonstrate the application of knowledge and skills: <ul style="list-style-type: none"> with initiative and judgement in planning, problem solving and decision making in professional practice and/or scholarship to adapt knowledge and skills in diverse contexts with responsibility and accountability for own learning and professional practice and in collaboration with others within broad parameters
Volume of learning	The volume of learning of a Bachelor Degree is typically 3 – 4 years

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Learning Outcomes of Masters Degree specified in AQF

Australian Qualifications Framework Second Edition January 2013
<https://www.aqf.edu.au/sites/aqf/files/aqf-2nd-edition-january-2013.pdf>

AQF level 9 criteria

Summary	Graduates at this level will have specialised knowledge and skills for research, and/or professional practice and/or further learning
Knowledge	Graduates at this level will have advanced and integrated understanding of a complex body of knowledge in one or more disciplines or areas of practice
Skills	Graduates at this level will have expert, specialised cognitive and technical skills in a body of knowledge or practice to independently: <ul style="list-style-type: none"> analyse critically, reflect on and synthesise complex information, problems, concepts and theories research and apply established theories to a body of knowledge or practice interpret and transmit knowledge, skills and ideas to specialist and non-specialist audiences
Application of knowledge and skills	Graduates at this level will apply knowledge and skills to demonstrate autonomy, expert judgement, adaptability and responsibility as a practitioner or learner

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Masters Degree qualification type descriptors 1/3

Australian Qualifications Framework Second Edition January 2013
<https://www.aqf.edu.au/sites/aqf/files/aqf-2nd-edition-january-2013.pdf>

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Masters Degree qualification type descriptors			
	Masters Degree (Research)	Masters Degree (Coursework)	Masters Degree (Extended)
Summary	The Masters Degree (Research) qualifies individuals who apply an advanced body of knowledge in a range of contexts for research and scholarship and as a pathway for further learning	The Masters Degree (Coursework) qualifies individuals who apply an advanced body of knowledge in a range of contexts for professional practice or scholarship and as a pathway for further learning	The Masters Degree (Extended) qualifies individuals who apply an advanced body of knowledge in a range of contexts for professional practice and as a pathway for further learning
Knowledge	Graduates of a Masters Degree (Research) will have: <ul style="list-style-type: none"> a body of knowledge that includes the understanding of recent developments in one or more disciplines advanced knowledge of research principles and methods applicable to the field of work or learning 	Graduates of a Masters Degree (Coursework) will have: <ul style="list-style-type: none"> a body of knowledge that includes the understanding of recent developments in a discipline and/or area of professional practice knowledge of research principles and methods applicable to a field of work and/or learning 	Graduates of a Masters Degree (Extended) will have: <ul style="list-style-type: none"> a body of knowledge that includes the extended understanding of recent developments in a discipline and its professional practice knowledge of research principles and methods applicable to the discipline and its professional practice

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Masters Degree qualification type descriptors 2/3

Australian Qualifications Framework Second Edition January 2013
<https://www.aqf.edu.au/sites/aqf/files/aqf-2nd-edition-january-2013.pdf>

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Skills	Graduates of a Masters Degree (Research) will have:	Graduates of a Masters Degree (Coursework) will have:	Graduates of a Masters Degree (Extended) will have:
	<ul style="list-style-type: none"> cognitive skills to demonstrate mastery of theoretical knowledge and to reflect critically on theory and its application cognitive, technical and creative skills to investigate, analyse and synthesise complex information, problems, concepts and theories and to apply established theories to different bodies of knowledge or practice cognitive, technical and creative skills to generate and evaluate complex ideas and concepts at an abstract level cognitive and technical skills to design, use and evaluate research and research methods communication and technical skills to present a coherent and sustained argument and to disseminate research results to specialist and non-specialist audiences technical and communication skills to design, evaluate, implement, analyse, theorise and disseminate research that makes a contribution to knowledge 	<ul style="list-style-type: none"> cognitive skills to demonstrate mastery of theoretical knowledge and to reflect critically on theory and professional practice or scholarship cognitive, technical and creative skills to investigate, analyse and synthesise complex information, problems, concepts and theories and to apply established theories to different bodies of knowledge or practice cognitive, technical and creative skills to generate and evaluate complex ideas and concepts at an abstract level communication and technical research skills to justify and interpret theoretical propositions, methodologies, conclusions and professional decisions to specialist and non-specialist audiences technical and communication skills to design, evaluate, implement, analyse and theorise about developments that contribute to professional practice or scholarship 	<ul style="list-style-type: none"> cognitive skills to demonstrate mastery of theoretical knowledge and to reflect critically on theory and professional practice cognitive, technical and creative skills to investigate, analyse and synthesise complex information, problems, concepts and theories and to apply established theories to different bodies of knowledge or practice cognitive, technical and creative skills to generate and evaluate complex ideas and concepts at an abstract level communication and technical research skills to justify and interpret theoretical propositions, methodologies, conclusions and professional decisions to specialist and non-specialist audiences technical and communication skills to design, evaluate, implement, analyse and theorise about developments that contribute to professional practice

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Masters Degree qualification type descriptors 3/3

Australian Qualifications Framework Second Edition January 2013
<https://www.aqf.edu.au/sites/aqf/files/aqf-2nd-edition-january-2013.pdf>

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Application of knowledge and skills	Graduates of a Masters Degree (Research) will demonstrate the application of knowledge and skills:	Graduates of a Masters Degree (Coursework) will demonstrate the application of knowledge and skills:	Graduates of a Masters Degree (Extended) will demonstrate the application of knowledge and skills:
	<ul style="list-style-type: none"> with creativity and initiative to new situations and/or for further learning with high level personal autonomy and accountability to plan and execute a substantial piece of research 	<ul style="list-style-type: none"> with creativity and initiative to new situations in professional practice and/or for further learning with high level personal autonomy and accountability to plan and execute a substantial research-based project, capstone experience and/or piece of scholarship 	<ul style="list-style-type: none"> with creativity and initiative to new situations in professional practice and/or for further learning with high level personal autonomy and accountability to plan and execute a substantial research-based project, capstone experience and/or professionally focused project
Volume of learning	The volume of learning of a Masters Degree (Research) is typically 1 – 2 years; in the same discipline 1.5 years following a level 7 qualification or 1 year following a level 8 qualification; in a different discipline 2 years following a level 7 qualification or 1.5 years following a level 8 qualification	The volume of learning of a Masters Degree (Coursework) is typically 1 – 2 years; in the same discipline 1.5 years following a level 7 qualification or 1 year following a level 8 qualification; in a different discipline 2 years following a level 7 qualification or 1.5 years following a level 8 qualification	The volume of learning of a Masters Degree (Extended) is typically 3 – 4 years following completion of a minimum of a 3 year level 7 qualification

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Learning Outcomes of Doctoral Degree specified in AQF

Australian Qualifications Framework Second Edition January 2013

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AQF level 10 criteria	
Summary	Graduates at this level will have systematic and critical understanding of a complex field of learning and specialised research skills for the advancement of learning and/or for professional practice
Knowledge	Graduates at this level will have systemic and critical understanding of a substantial and complex body of knowledge at the frontier of a discipline or area of professional practice
Skills	Graduates at this level will have expert, specialised cognitive, technical and research skills in a discipline area to independently and systematically: <ul style="list-style-type: none"> engage in critical reflection, synthesis and evaluation develop, adapt and implement research methodologies to extend and redefine existing knowledge or professional practice disseminate and promote new insights to peers and the community generate original knowledge and understanding to make a substantial contribution to a discipline or area of professional practice
Application of knowledge and skills	Graduates at this level will apply knowledge and skills to demonstrate autonomy, authoritative judgement, adaptability and responsibility as an expert and leading practitioner or scholar

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Doctoral Degree qualification type descriptor

Doctoral Degree qualification type descriptor

41	Purpose	The Doctoral Degree qualifies individuals who apply a substantial body of knowledge to research, investigate and develop new knowledge, in one or more fields of investigation, scholarship or professional practice
	Knowledge	<p>Graduates of a Doctoral Degree will have:</p> <ul style="list-style-type: none"> • a substantial body of knowledge at the frontier of a field of work or learning, including knowledge that constitutes an original contribution • substantial knowledge of research principles and methods applicable to the field of work or learning
	Skills	<p>Graduates of a Doctoral Degree will have:</p> <ul style="list-style-type: none"> • cognitive skills to demonstrate expert understanding of theoretical knowledge and to reflect critically on that theory and practice • cognitive skills and use of intellectual independence to think critically, evaluate existing knowledge and ideas, undertake systematic investigation and reflect on theory and practice to generate original knowledge • expert technical and creative skills applicable to the field of work or learning • communication skills to explain and critique theoretical propositions, methodologies and conclusions • communication skills to present cogently a complex investigation of originality or original research for external examination against international standards and to communicate results to peers and the community • expert skills to design, implement, analyse, theorise and communicate research that makes a significant and original contribution to knowledge and/or professional practice
	Application of knowledge and skills	<p>Graduates of a Doctoral Degree will demonstrate the application of knowledge and skills:</p> <ul style="list-style-type: none"> • with intellectual independence • with initiative and creativity in new situations and/or for further learning • with full responsibility and accountability for personal outputs • to plan and execute original research • with the ongoing capacity to generate new knowledge, including in the context of professional practice
C	Volume of learning	The volume of learning of a Doctoral Degree is typically 3 – 4 years

Categories of Learning Outcomes (AUN-QA)

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- **Specific outcomes:**
The outcomes that relate to the subject discipline and the knowledge, skills and/or competences particular to it.
 - **Generic outcomes (sometimes called transferable skills)**
The outcomes that relate to any and all disciplines e.g. written, oral, problem-solving, information technology, and team working skills, etc.

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QA at Programme Level



Generic learning outcomes (AQF)

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Generic learning outcomes are the transferrable, non discipline specific skills a graduate may achieve through learning that have application in study, work and life contexts. The four broad categories of generic learning outcomes recognised in the AQF are:

- **fundamental skills**, such as literacy and numeracy appropriate to the level and qualification type
- **people skills**, such as working with others and communication skills
- **thinking skills**, such as learning to learn, decision making and problem solving
- **personal skills**, such as self direction and acting with integrity.

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Aims (Goals), Objectives and LOs



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QA at Programme Level

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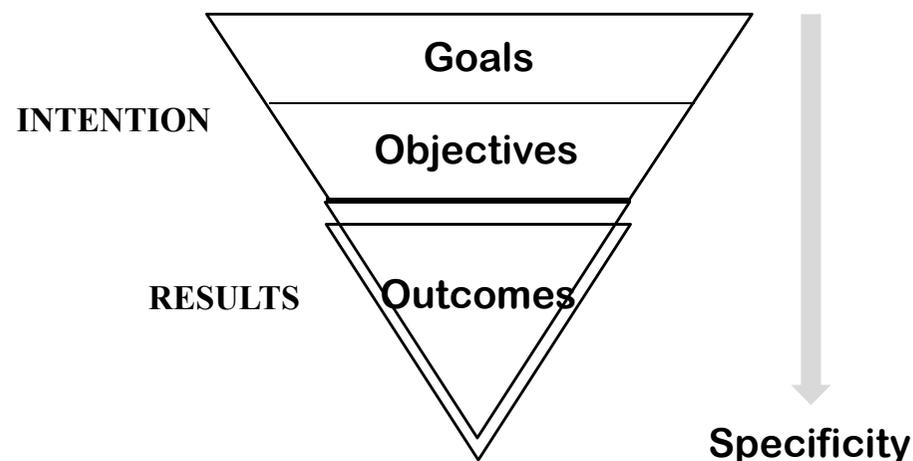
Aims (Goals), Objectives and LOs

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

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

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Translate Goals (Aims) and Objectives to ELO

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Goals/Aim "To implement the undergraduate education to master the concepts of modern biology".

Objectives "To empower community through the application of modern biological innovations"

Learning outcome "Students should be able to **apply** the modern biological innovations underpinning the use of molecular biology to community.

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

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

- At the end of this course, **students** should be able to
- On successful completion of this course, **students** will be able to

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

What is yours ...

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- What is your Programme Goals or Aims?
(a broad general statement of teaching intention)
- What is your Programme Objectives?
(a specific statement of teaching intention)

Group discussion:

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Your Time Is! NOW!



Easy Syntax..... ELO Statement

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Syntax

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

Graduates of our program shall have:

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

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SMART

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SMART helps to check an LO that required characteristics:

- **Specific:** accurately states what the successful student is expected to achieve
- **Measurable:** open to assessment which accurately assesses whether or not the outcome has been achieved
- **Achievable:** should be within the range of abilities of the student
- **Relevant:** should be relatable to the key aims of the programme
- **Time scaled:** must be achievable within the duration of the study-unit/programme

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Recommended Verbs for Writing Learning Outcomes

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COGNITIVE (K)

REMEMBER	UNDERSTAND	APPLY	ANALYZE	EVALUATE	CREATE
Retrieve knowledge from long-term memory	Construct meaning from instructional messages, including oral, written, graphic communication	Carry out/use procedure in a given situation	Break material into constituent parts; determine how parts relate to one another and to an overall structure or purpose	Make judgments based on criteria and standards	Put elements together to form coherent or functional whole; reorganize elements into a new pattern or structure
<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>
<ul style="list-style-type: none"> Define Describe Label List Match Recall Recognize State 	<ul style="list-style-type: none"> Classify Compare Discuss Exemplify Explain Identify Illustrate Infer Interpret Predict Report Review Summarize Translate 	<ul style="list-style-type: none"> Apply Change Choose Demonstrate Execute Implement Prepare Solve Use 	<ul style="list-style-type: none"> Analyze Attribute Debate Differentiate Distinguish Examine Organize Research 	<ul style="list-style-type: none"> Appraise Check Critique Judge 	<ul style="list-style-type: none"> Compose Construct Design Develop Formulate Generate Invent Make Organize Plan Produce Propose

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

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PSYCHOMOTOR (S)

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PERCEIVE	SET	RESPOND AS GUIDED	ACT	RESPOND OVERTLY	ADAPT	ORGANIZE
Senses cues that guide motor activity	Is mentally, emotionally, physically ready to act	Imitates and practices skills	Performs acts with increasing efficiency, confidence, ad proficiency	Performs acts automatically	Adapts skill sets to solve a problem	Creates new patterns for specific situations
<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>
<ul style="list-style-type: none"> Detect Differentiate Distinguish Identify Observe Recognize Relate Describe the perception Describe the sensation: <ul style="list-style-type: none"> Hear Listen See Smell Taste 	<ul style="list-style-type: none"> Assume a stance Display Perform motor skills Position the body Proceed Show 	<ul style="list-style-type: none"> Copy Duplicate Imitate Operate under supervision Practice Repeat Reproduce 	<ul style="list-style-type: none"> Assemble Calibrate Complete with confidence Conduct Construct Dismantle Fix Execute Improve efficiency Make Manipulate Measure Mend Organize Produce 	<ul style="list-style-type: none"> Act habitually Control Direct Guide Manage Perform <p><i>Note: Same verbs as "ACT", but with modifiers describing the performance, e.g., faster, better, more accurate, outstanding, etc.</i></p>	<ul style="list-style-type: none"> Adapt Alter Change Rearrange Reorganize Revises 	<ul style="list-style-type: none"> Arrange Build Compose Construct Create Design Originate Make

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AFFECTIVE (A)

RECEIVE	RESPOND	VALUE	ORGANIZE	INTERNALIZE (CHARACTERIZE)
Selectively responds to stimuli	Responds to stimuli	Attaches value or worth to something	Conceptualizes value and resolves conflict between this value and other values	Integrate the value into a value system that controls behavior
<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>	<u>Sample Verbs:</u>
<ul style="list-style-type: none"> Acknowledge Choose Demonstrate awareness Demonstrate tolerance Locate Select 	<ul style="list-style-type: none"> Answer Communicate Comply Contribute Cooperate Discuss Participate willingly Volunteer 	<ul style="list-style-type: none"> Adopt Assume responsibility Behave according to Choose Commit Express Initiate Justify Propose Show concern Use resources to 	<ul style="list-style-type: none"> Adapt Adjust Arrange Balance Classify Conceptualize Formulate Organize Prepare Rank Theorize 	<ul style="list-style-type: none"> Act upon Advocate Defend Exemplify Influence Perform Practice Serve Support

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Examples of Remembering/Understanding

56

- Recall genetics terminology: homozygous, heterozygous, phenotype, genotype, etc.
- Identify and consider ethical implications of scientific investigations.
- List the criteria to be taken into account when caring for a patient with tuberculosis.
- Differentiate between civil and criminal law.
- Identify participants and goals in the development of electronic commerce.
- Predict the genotype of cells that undergo meiosis and mitosis.
- Classify reactions as exothermic and endothermic.

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Examples of Applying/Analyzing

57

- Apply knowledge of infection control in the maintenance of patient care facilities.
- Relate energy changes to bond breaking and formation.
- Modify guidelines in a case study of a small manufacturing firm to enable tighter quality control of production.
- Analyse why society criminalises certain behaviours.
- Compare and contrast the different electronic business models.
- Debate the economic and environmental effects of energy conversion processes.

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Examples of Evaluating/Creating

58

- Recognise and formulate problems that are amenable to energy management solutions.
- Propose solutions to complex energy management problems both verbally and in writing.
- Relate the sign of enthalpy changes to exothermic and endothermic reactions.
- Organise a patient radiation protection procedure.
- Predict the effect of change of temperature on the position of equilibrium.

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AUN 1: Expected Learning Outcomes (3)

59

1	Expected Learning Outcomes
1.1	The expected learning outcomes have been clearly formulated and aligned with the vision and mission of the university. [1,2]
1.2	The expected learning outcomes cover both subject specific and generic (i.e. transferable) learning outcomes. [3]
1.3	The expected learning outcomes clearly reflect the requirements of the stakeholders. [4]

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Criterion 1 Expected Learning Outcomes

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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.
2.	The programme shows the expected learning outcomes of the graduate. Each course and should
3.	To meet Requirements Content the
4.	The programme has clearly formulated the expected learning outcomes which reflect the relevant demands and needs of the stakeholders.

1	Expected Learning Outcomes	1	2	3	4	5	6	7
1.1	The expected learning outcomes have been clearly							
1.2	The To write Checklist Context							
1.3	The expected learning outcomes clearly reflect the requirements of the stakeholders [4]							
Overall opinion								

Diagnostic Question

- What is **To inquire** **QA** **Construct**
- What are
- How
- CL1 - Do the learning outcomes reflect the vision and mission of the university, faculty or department?

1. Expected Learning Outcomes

61

Requirements (4)

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.
2. The programme 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.

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1. Expected Learning Outcomes

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Requirements (4)

3. The programme 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 programme has clearly formulated the expected learning outcomes which reflect the relevant demands and needs of the stakeholders.

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Easy Syntax..... ELO Statement

63

Graduates of our program shall have:

- (c) 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**

Syntax

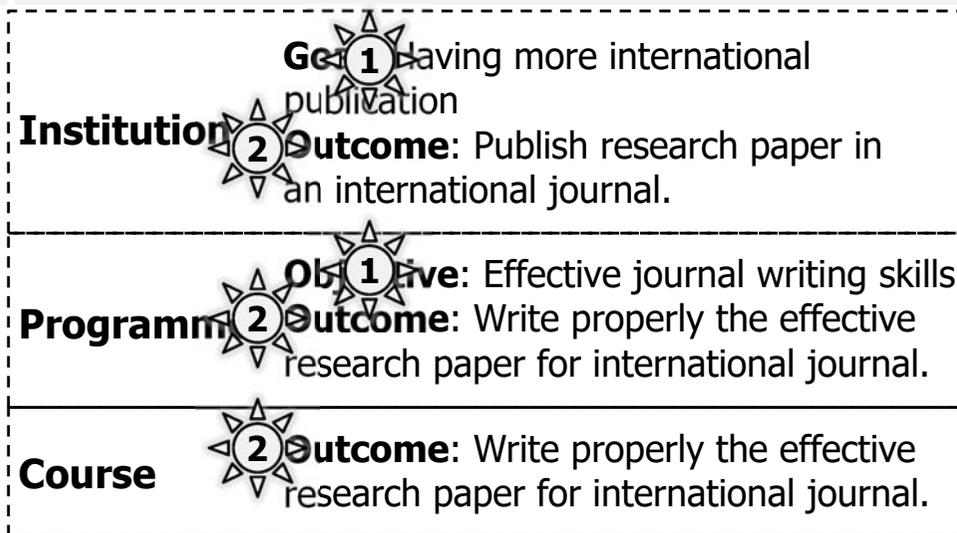
- (c) **Action verb** (Educational Taxonomy)
+ Objects + Modification (T&L/Assessment)

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EX.: Goals (Objs) and Learning Outcomes

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What is your ...

65

- What is your Programme Aims?
(a broad general statement of teaching intention)
- What is your Programme Objectives?
(a specific statement of teaching intention)

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Example

66

- **Programme aims** to produce graduates who possess in-depth knowledge and skills for scientific decision making, and are able to construct models and analyse the problems accordingly. The possessed knowledge and skill should also be integrated in the other field areas such as economy, accounting and management.

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Programme Learning Outcomes

67

LOD 1	Apply knowledge of mathematics, probability, statistics, operational research/decision science and operation management, as well as information and communication technology (ICT).
LOD 2	Design, model and solve real world and hypothetical problems, and thus able to analyse and interpret data using contemporary computer tools.
LOD 3	Use quantitative techniques, modelling skills and contemporary decision science tools for industries, public institution and society.
LOD 4	Communicate effectively orally, graphically and in writing, and function in culturally diverse, gender-diverse and multi-disciplinary teams.
LOD 5	Integrate and synthesize organisational issues, and evaluate potential solutions in the broader context of the organisation or society.
LOD 6	Participate in lifelong learning, career advancement activities, and keep up-to-date with knowledge of emerging technologies.
LOD 7	Commercialise tangible and intangible decision making products, in the form of written, oral and electronic media.
LOD 8	Carry out professional and ethical responsibility.
LOD 9	Portray leadership and accountability, and exercising management and decision making skills.

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Business Programme

68

Students will be able to:

- **Work** in groups and be part of an effective team.
- **Communicate** business knowledge both orally and written.
- **Recognize and respond** appropriately to an ethical and regulatory dilemma.
- **Recognize and diagnose** accounting problems.
- **Demonstrate** disciplinary competence in a field of business.

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Example

Humanities and Fine Arts:

69

Example

- **Demonstrate** fluency with formal vocabulary, artistic techniques and procedures of two dimensional and three-dimensional art practice.
- **Demonstrate** in-depth knowledge of artistic periods used to interpret works of art including the historical, social and philosophical contexts .
- **Critique** and **analyze** works of art and visual objects .
- **Identify** musical elements, take them down at dictation, and perform them at sight.
- **Communicate** both orally and verbally about music of all genres and styles in a clear and articulate manner.
- Able to **analyze** and **interpret** scripts.

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Civil Engineering, B.S.

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

70

Program Mission

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

Program Educational Objectives

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

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Student Outcomes

Graduates of our program shall have:

- 71
- (a) an ability to apply knowledge of mathematics, science, and engineering;
 - (b) an ability to conduct laboratory experiments and to critically analyze and interpret data in more than one of the recognized major civil engineering areas;
 - (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
 - (d) an ability to function on multidisciplinary teams;
 - (e) an ability to identify, formulate, and solve engineering problems;
 - (f) an understanding of professional and ethical responsibilities;
 - (g) an ability to communicate effectively;
 - (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;

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Student Outcomes

- 72
- (i) a recognition of the need for, and an ability to engage in life-long learning;
 - (j) a knowledge of contemporary issues;
 - (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;
 - (l) apply knowledge in a minimum of four (4) recognized major civil engineering areas;
 - (m) an ability to perform civil engineering design by means of design experiences integrated throughout the professional component of the curriculum; and
 - (n) an understanding of professional practice issues such as: procurement of work; bidding versus quality based selection processes; how the design professionals and the construction professions interact to construct a project; the importance of professional licensure and continuing education; and/or other professional practice issues.

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

73

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

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Communication and Information Sciences Ph.D. Program

74

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

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Ph.D. – Economic Programme

75

- SLO1. Demonstrate an ability to apply the economic theory and analytical and quantitative tools.
- SLO2. Demonstrate an ability to integrate, and apply the various tools, concepts, and principles of economics and quantitative methods to analyze and to develop solutions to economic problems in a clear and concise written form.
- SLO3. Demonstrate a "frontier" level competency and familiarity with the literature in the student's perceived specialty area.
- SLO4. Demonstrate the ability to conduct independent and original research in economics.
- SLO5. Have the skills necessary to qualify for teaching positions at the university and college levels, and for research positions in the public or private sector.

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Exercise 1: Formulation of Expected Learning Outcomes (ELOs)

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Step to formulate ELOs

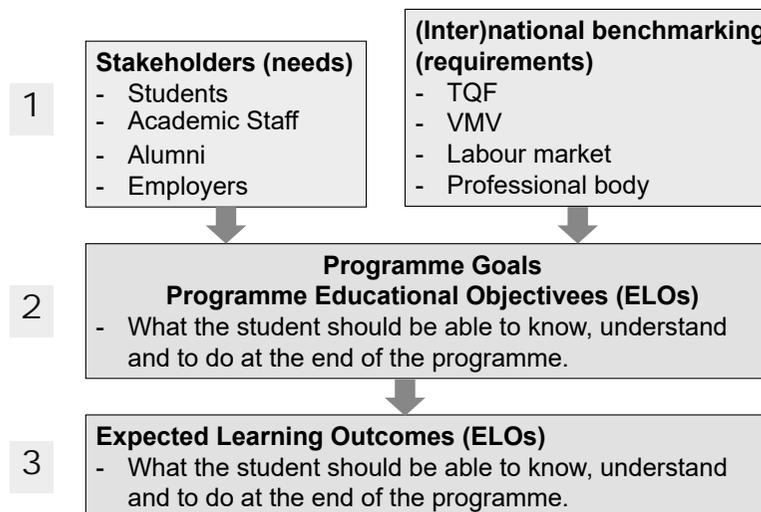
- 77 (1) Find out → What are
- the requirements of accreditation body, benchmarked institution, labour market, NQF and/or professional body?
 - the requirements of students, academic staff, alumni and employers?
 - the Vision, Mission, Values and Graduate attributes of MU, faculty and/or department?
- (2) Translate all information of No.(1) to formulate your Programme Goals (Aims) and/or Programme Educational Objectives.
- (3) Formulate Expected Learning Outcomes (ELOs) of your programme

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Step to formulate ELOs

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Exercise 1: Formulate Programme ELOs

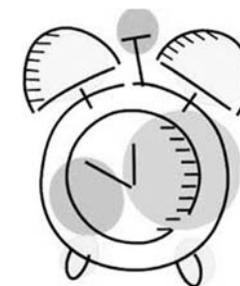
79

- 1) Formulate Programme Goals (Aims) and Programme Objectives)
- Discuss in your group.**
- 2) Formulate Expected Learning Outcomes (ELOs) of your programme. Then review:
- How each ELO statement looks SMART?
 - How each ELO statement aligns with VMV-MU/FAC?
 - How each ELO statement aligns with Programme Goals (Aims) and Programme Objectives?
- Discuss in your group.**

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Your Time is Now..



Writing of ELOs – What you should do ...

81

In the statement of learning outcomes;

- use only **action verbs of the same level of taxonomy** per learning outcome and target specific aspects of expected performance include action verbs,
- **avoid** vague verbs such as **know** and **understand**
- **write in terms of what the learner will do**, not what the instructor will do,

ELOs – After finished please review...

82

ELOs	VMV	PG/PEO	SMART				
			S	M	A	R	T
ELO1	What?		✓	✓	✓	✓	✓
ELO2		What?	✓	✓	✓	✓	✓
ELO3			✓	✓	✓	✓	✓
ELO4			✓	✓	✓	✓	✓
ELO5			✓	✓	✓	✓	✓
ELO6			✓	✓	✓	✓	✓

S = Specific, **M** = Measurable, **A** = Achievable, **R** = Relevant, **T** = Time scale

Alignment of Stakeholders' Requirements with ELOs

83

No	ELO	NQF	student	Academic staff	Alumni	Employer
1		What?				
2			What?			
3				What?		
4					What?	
5						What?
6						
7						
8						

Classification of ELOs

84

ELOs	K	Skills		C	AUN-QA	
		Hard	Soft		Specific	Generic
ELO1						
ELO2						
ELO3						
ELO4						
ELO5						
ELO6						

K = Knowledge,

S = Skill,

A = Application and responsibility

(Competence, Application of knowledge and skills)

Align Teaching & Learning and Assessment Schemes with ELOs (Constructive Alignment)

85

No	ELO	T&L Approach	Assessment Scheme
1		Depending on the level of taxonomy stated	Depending on the level of taxonomy stated
2			
3			
4		What?	
5			What?
6			
7			

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Example

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ELO according to Bloom	Teaching method	Assessment and Evaluation method	Study Method
Knowledge Remembering	Giving lectures	Oral test, written test, MCQ	Attending lectures and Independent Study
Understanding / Applying	Brain storming and pair work	Presentation and Q&A	Independent Study, Practice
Analyzing/Evaluating	Cooperative Learning Problem-based Teaching	Class Test, Project-based assignment, Seminar	Practice, Report Preparation
Creating	Teaching through Project Conduction, Situation Examination, Simulation or Conduction with the public attendance	Project Assignment	Practice, Report Writing

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SOLO TAXONOMY (after Biggs and Collis 1982)

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Structure of Observed Learning Outcomes

Define
Identify
Do simple procedure

Define
Describe
List
Do algorithm
Combine

Compare/contrast
Explain causes
Sequence
Classify
Analyse
Part/whole
Relate
Analogy
Apply
Formulate questions

Evaluate
Theorise
Generalise
Predict
Create
Imagine
Hypothesise
Reflect



• Prestructural	I Unistructural	III Multistructural	IV Relational	V Extended Abstract
Needs assistance	Definition identifies one relevant idea	Definition identifies several relevant ideas	Definition identifies several relevant ideas and links these to the whole	Definition identifies several relevant ideas and links these to the whole. Taken into another context.

Bloom 1-3

Bloom 4 ✓

Bloom 5 ✓

Bloom 6

Prestructural Unistructural Multistructural Relational Extended abstract

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Masters Degree qualification type descriptors 2/3

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Australian Qualifications Framework Second Edition January 2013
<https://www.aqf.edu.au/sites/aqf/files/aqf-2nd-edition-january-2013.pdf>

Skills	Graduates of a Masters Degree (Research) will have:	Graduates of a Masters Degree (Coursework) will have:	Graduates of a Masters Degree (Extended) will have:
	<ul style="list-style-type: none"> cognitive skills to demonstrate mastery of theoretical knowledge and to reflect critically on theory and its application cognitive, technical and creative skills to investigate, analyse and synthesise complex information, problems, concepts and theories and to apply established theories to different bodies of knowledge or practice cognitive, technical and creative skills to generate and evaluate complex ideas and concepts at an abstract level cognitive and technical skills to design, use and evaluate research and research methods communication and technical skills to present a coherent and sustained argument and to disseminate research results to specialist and non-specialist audiences technical and communication skills to design, evaluate, implement, analyse, theorise and disseminate research that makes a contribution to knowledge 	<ul style="list-style-type: none"> cognitive skills to demonstrate mastery of theoretical knowledge and to reflect critically on theory and professional practice or scholarship cognitive, technical and creative skills to investigate, analyse and synthesise complex information, problems, concepts and theories and to apply established theories to different bodies of knowledge or practice cognitive, technical and creative skills to generate and evaluate complex ideas and concepts at an abstract level communication and technical research skills to justify and interpret theoretical propositions, methodologies, conclusions and professional decisions to specialist and non-specialist audiences technical and communication skills to design, evaluate, implement, analyse and theorise about developments that contribute to professional practice or scholarship 	<ul style="list-style-type: none"> cognitive skills to demonstrate mastery of theoretical knowledge and to reflect critically on theory and professional practice cognitive, technical and creative skills to investigate, analyse and synthesise complex information, problems, concepts and theories and to apply established theories to different bodies of knowledge or practice cognitive, technical and creative skills to generate and evaluate complex ideas and concepts at an abstract level communication and technical research skills to justify and interpret theoretical propositions, methodologies, conclusions and professional decisions to specialist and non-specialist audiences technical and communication skills to design, evaluate, implement, analyse and theorise about developments that contribute to professional practice

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Masters Degree qualification type descriptors 3/3

Australian Qualifications Framework Second Edition January 2013
<https://www.aqf.edu.au/sites/aqf/files/aqf-2nd-edition-january-2013.pdf>

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Application of knowledge and skills	Graduates of a Masters Degree (Research) will demonstrate the application of knowledge and skills: <ul style="list-style-type: none"> • with creativity and initiative to new situations and/or for further learning • with high level personal autonomy and accountability • to plan and execute a substantial piece of research 	Graduates of a Masters Degree (Coursework) will demonstrate the application of knowledge and skills: <ul style="list-style-type: none"> • with creativity and initiative to new situations in professional practice and/or for further learning • with high level personal autonomy and accountability • to plan and execute a substantial research-based project, capstone experience and/or piece of scholarship 	Graduates of a Masters Degree (Extended) will demonstrate the application of knowledge and skills: <ul style="list-style-type: none"> • with creativity and initiative to new situations in professional practice and/or for further learning • with high level personal autonomy and accountability • to plan and execute a substantial research-based project, capstone experience and/or professionally focused project
Volume of learning	The volume of learning of a Masters Degree (Research) is typically 1 – 2 years; in the same discipline 1.5 years following a level 7 qualification or 1 year following a level 8 qualification; in a different discipline 2 years following a level 7 qualification or 1.5 years following a level 8 qualification	The volume of learning of a Masters Degree (Coursework) is typically 1 – 2 years; in the same discipline 1.5 years following a level 7 qualification or 1 year following a level 8 qualification; in a different discipline 2 years following a level 7 qualification or 1.5 years following a level 8 qualification	The volume of learning of a Masters Degree (Extended) is typically 3 – 4 years following completion of a minimum of a 3 year level 7 qualification

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Doctoral Degree qualifications

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- The **purpose** of the Doctoral Degree is to qualify individuals who apply a substantial body of knowledge to research, investigate and develop new knowledge, in one or more fields of investigation, scholarship or professional practice.
- **Research** is the defining characteristic of all Doctoral Degree qualifications. There are **two forms of Doctoral Degree with the same descriptor** within the Research Doctoral Degree qualification type: the Doctoral Degree (typically referred to as a Doctor of Philosophy) and the Professional Doctoral Degree (typically titled Doctor of [field of study])
- The emphasis in the learning outcomes and research may differ between the different forms of Doctoral Degree qualifications but all graduates will demonstrate knowledge, skills and the application of the knowledge and skills at AQF level 10.

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Doctoral Degree (Research)

91

- The Doctoral Degree (Research) qualification (leading to the award of a *Doctor of Philosophy*) is designed so that graduates will have undertaken a program of independent supervised study that produces significant and original research outcomes culminating in a thesis, dissertation, exegesis or equivalent for independent examination by at least two external expert examiners of international standing.
- *Research* in the program of learning will be for at least two years and typically two-thirds or more of the qualification. The program of learning may also include advanced coursework to enhance the student's capacity to make a significant contribution to knowledge in the discipline (or cross-disciplinary field). The advanced coursework may support but not replace the research outcomes.

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Doctoral Degree (Professional)

92

- The Doctoral Degree (Professional) qualification is designed so that graduates will have undertaken a program of structured learning and independent supervised study that produces significant and original research outcomes culminating in a thesis, dissertation, exegesis or equivalent for independent examination by at least two external expert examiners of international standing.
- *Research* in the program of learning will be typically for at least two years of the qualification. The program of structured learning typically will include advanced coursework designed to enhance the student's capacity to make a significant contribution to original knowledge in the discipline (or cross-disciplinary field) and/or research integrated practice developed in collaboration with a relevant professional, statutory or regulatory body. The advanced coursework and research-integrated practice will support the research outcomes.

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5 Basic steps in a curriculum design based on OBE

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

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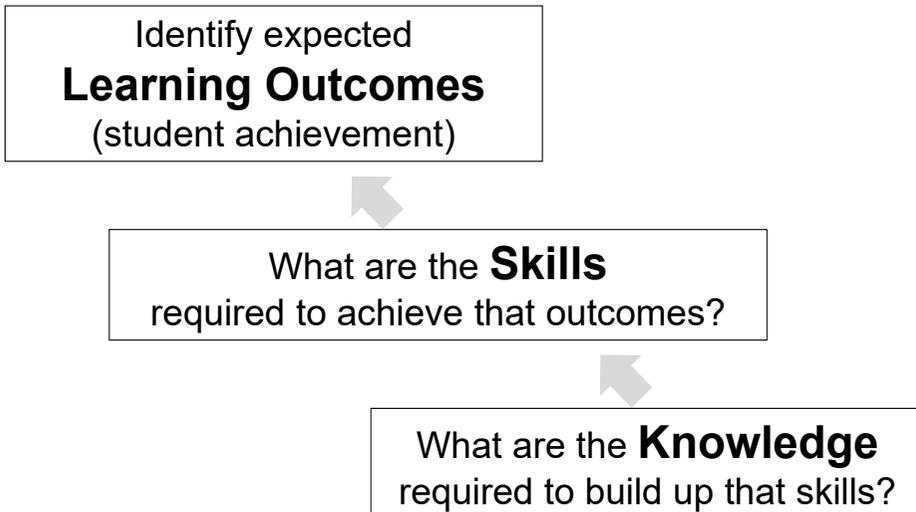
From ELOs



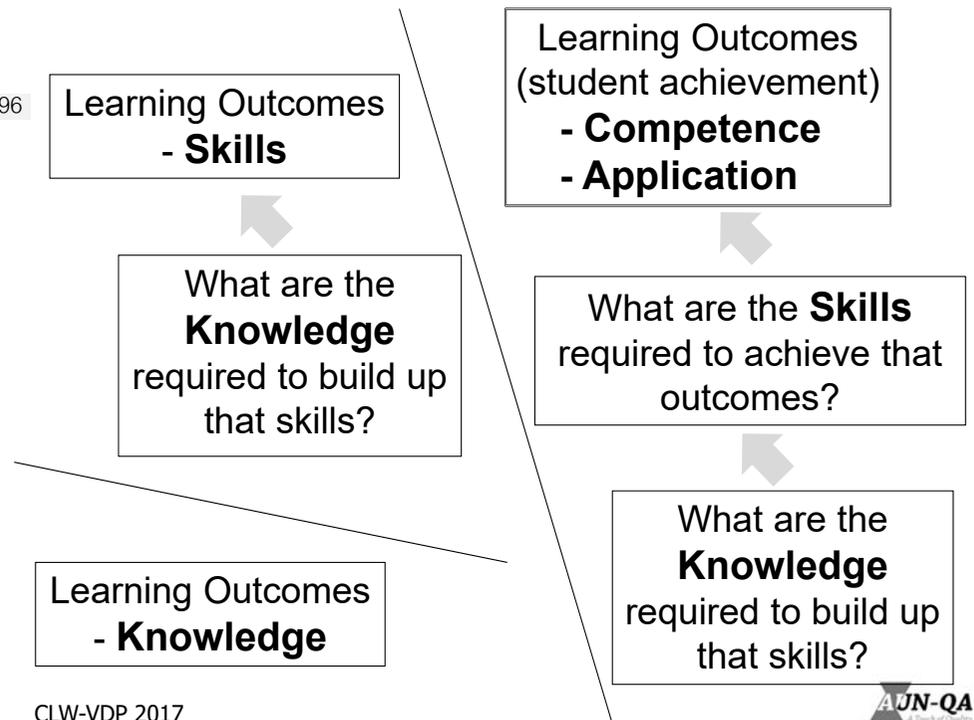
Design the Curriculum Using
Backward Curriculum Design

Backward Design Process

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96



(2) Backward Design Curriculum, BDC

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

ELO4: Perform imaging of CT-brain in emergency

98

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

ELO4: Perform imaging of CT-brain in emergency

99

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

ELO4: Perform imaging of CT-brain in emergency

100

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

Combine into a subject/course

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



ELO 3: Develop, adapt and implement research methodologies to extend and redefine existing knowledge and/or professional practice

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Specific skill required	Generic skill required	Knowledge required
SS1 Develop research question	GS1 IT skill GS2 Reading skill (English proficiency)	K1 Research methodology K2 Literature review K3 Professional knowledge
SS2 Research plan	GS3 Decision making	K1 Research methodology
SS3		
THESIS		

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ELO 3: Develop, adapt and implement research methodologies to extend and redefine existing knowledge and/or professional practice

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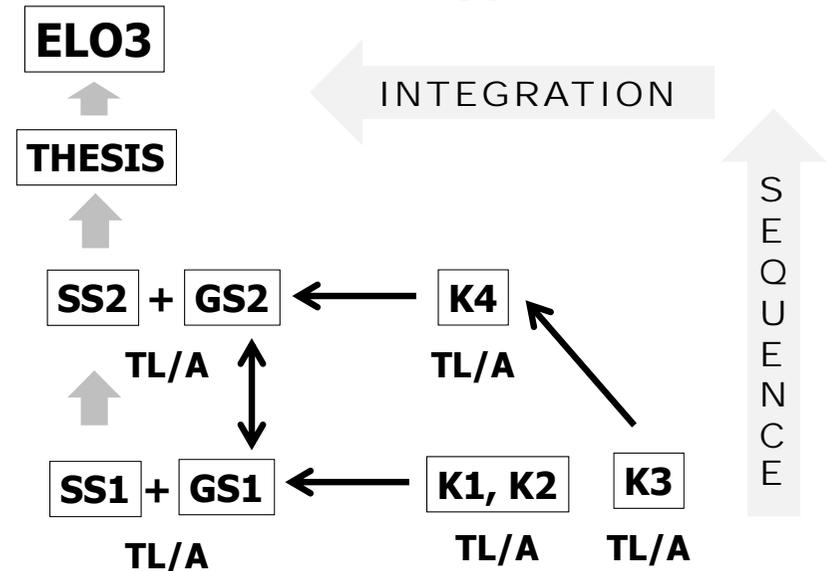
Specific skill required	Generic skill required	TL	A	Knowledge required	TL	A
SS1 Develop research question	GS1 IT skill GS2 Reading skill (English proficiency)			K1 Research methodology K2 Literature review K3 Professional knowledge		
SS2 Research plan	GS3 Decision making			K1 Research methodology		
SS3						
THESIS						

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BDC: Approach of T&L

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Transform BDC to Courses, Modules, Activities

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

For **example: From ELO3,**

Course C1 = K1 + K2 + K3

Course C2 = SS1 + GS1

Course C3 = K4 + SS2 + GS2

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From the backward design curriculum ...

106

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

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

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BS – Conservation Biology

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

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Exercise 2: Curriculum Design Using Backward design Technique

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Backward curriculum design

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Procedures:

1. From each ELO/Competence, determine the specific and/or generic skills need to achieve that ELO.
2. From each specific and/or generic skills, determine the knowledge need to achieve that particular skill.
3. Transform BCD to Courses and Activities

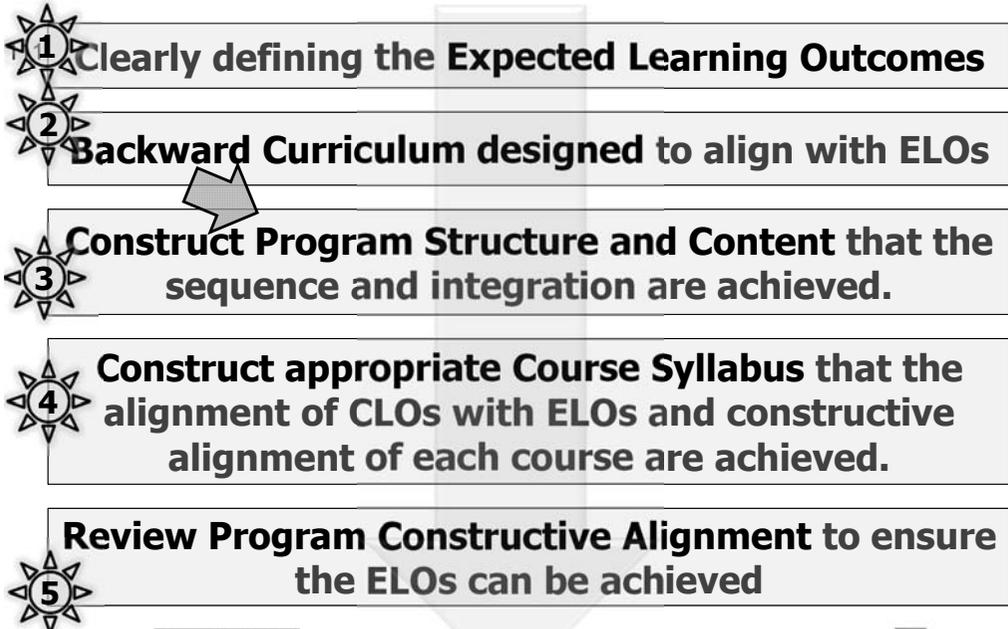
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Your Time is Now.



5 Basic steps in a curriculum design based on OBE

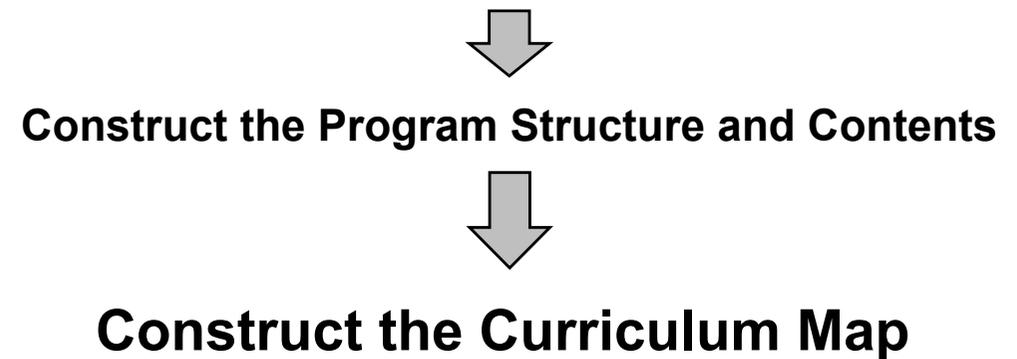


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From ELOs and BDC



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AUN 3: Programme Structure and Content (3)

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3	Programme Structure and Content
3.1	The curriculum is designed based on constructive alignment with the expected learning outcomes. [1]
3.2	The contribution made by each course to achieve the expected learning outcomes is clear. [2]
3.3	The curriculum is logically structured, sequenced, integrated and up-to-date. [3,4,5,6]

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3. Programme Structure and Content

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Requirements (6)

1. The curriculum, teaching and learning methods and student assessment are constructively aligned to achieve the expected learning outcomes.
2. The curriculum is designed to meet the expected learning outcomes where the contribution made by each course in achieving the programme's expected learning outcomes is clear.
3. The curriculum is designed so that the subject matter is logically structured, sequenced, and integrated.

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3. Programme Structure and Content

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Requirements (6)

4. The curriculum structure shows clearly the relationship and progression of basic courses, the intermediate courses, and the specialised courses.
5. 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.
6. The curriculum is reviewed periodically to ensure that it remains relevant and up-to-date

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Curriculum in OBE Framework

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The **curriculum should be designed** so that

- the teaching activities, learning activities and assessment tasks are co-ordinated with the expected learning outcomes (**Constructive Alignment at Programme Level**), and
- the curriculum is logically **structured, sequenced and integrated**.

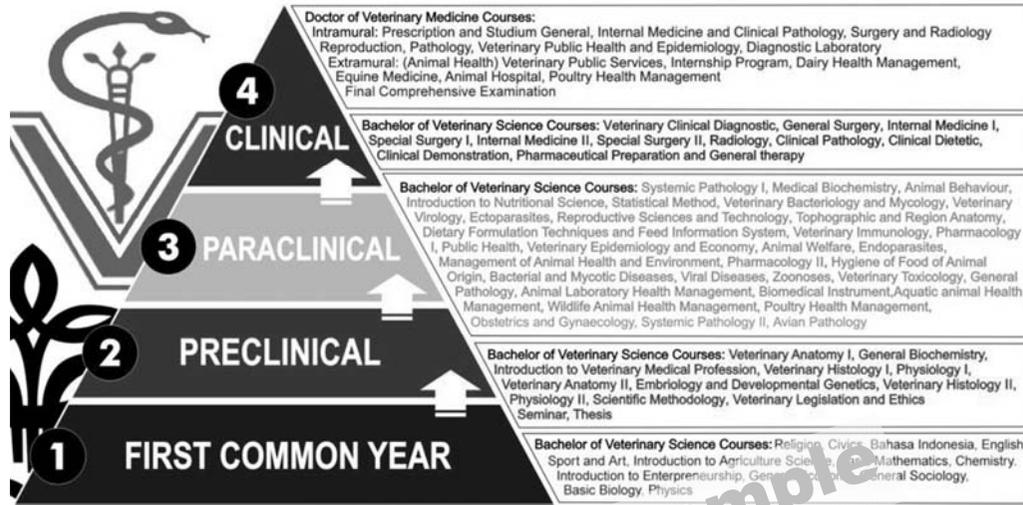
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QA at Programme Level

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Programme structure of DVM

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Curriculum Structure of BSP

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STRENGTHENING THE UNDERSTANDING & PRACTICAL OF RESEARCH BY USING INTERDISCIPLINARY APPROACHES (Related to Biological Conservation and Bioengineering)				Applying research methodology & scientific writing	Work as Biological in the laboratory and field area	Sem 7-8
Application of competencies in intership as consultant, researcher and entrepreneur		Developing bio-entrepreneurship spirit, and capability in communicating both in Indonesian language and English				Sem 5-6
COORDINATION, REGULATION, GROWTH, DEVELOPMENT AND THEIR ANALYSIS						Sem 2-4
Coordination & communication in the biosystems	Growth & development	Problem analyzing & solving in the biosystematics	Biosystematics modelling			Sem 1
STRUCTURE & FUNCTION IN LIVING CREATURE ORGANIZATION						
Biodiversity From border life to macroorganism		Structure of living creature organization: From molecule, cell, tissue, organ, individual, population, community to		Interaction between structure & function in micro-macroorganism		
BASIC SCIENCES SUPPORTING THE MODERN BIOLOGY & SUCCESS LIFE SKILLS						
Basic sciences that supports the role understanding and contribution of Biology in the future			Success skills guidance (to be outstanding learner in UB & in the society)			

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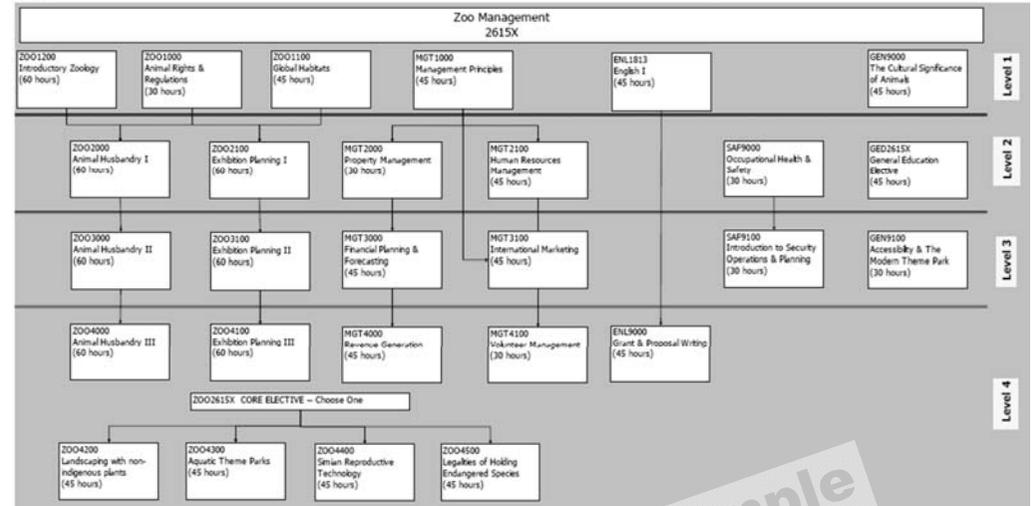
Concentration	Public Policy	Public Service	Developmental	Governmental
Genetic & Specialized Knowledge and Skill	Religion, Pancasila, Citizenship Education, Indonesian Language, English Language, Introduction to Public Administration Science, Organizational Theory, Administration Analysis, Law of Public Administration, History of Administrative Science Thinking, Indonesian Social Cultural System, Management Principles, Ethics in Public Administration, Organizational Communication, Organizational Behavior & Development, Statistic, Public Administration Theory, Research Method, Entrepreneurship, Performance in Public Sector Organization, Bureaucracy, Strategic Management for Public Sector, Leadership, Methods of Scientific Writing, Governance Theory, Global Governance, Qualitative & Quantitative Data Analysis, Development of Capacity and Institutional of Public Sector, Public Finance Management, Comparative of Public Administration, Human Resource Management for Public Sector, Administrative Reform, Ecology of Administration, Empowerment of Local Community and Resource, Internship			
	Public Policy I, Public Policy II, Indonesian Political System, Decision Making, Fiscal & Financial Policy	Public Service Management, Public Management Theory, Information System Management of Public Sector	Theory of Development, Administration of Development, Planning, Political Economy of Development, Urban Developmental Policy	Indonesian Public Administration System, Local Governmental System
Concentration course	Seminar of Public Policy Issues	Seminar of Public Service Issues	Seminar of Developmental Issues	Seminar of Governmental Issues
Final Project	Thesis	Thesis	Thesis	Thesis

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Programme Structure

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QA at Programme Level

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Programme Structure

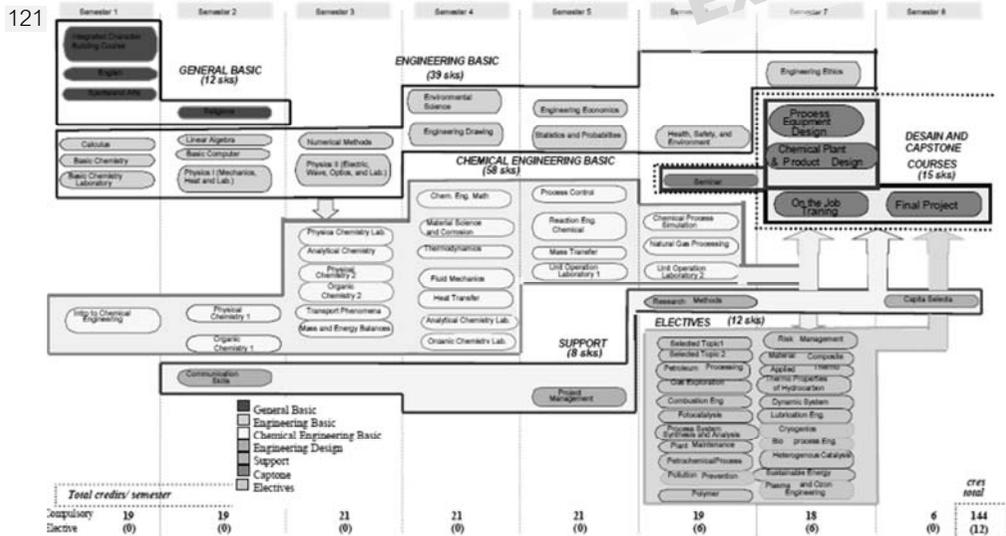


Figure 2.2 Curriculum Structure of ChESP

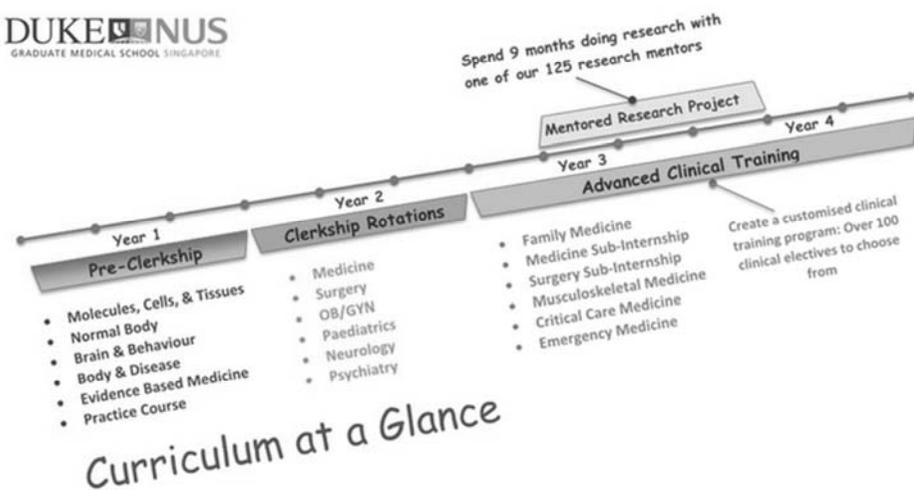
Source: Chemical Engineering, Universitas Indonesia

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QA at Programme Level



MD Programme

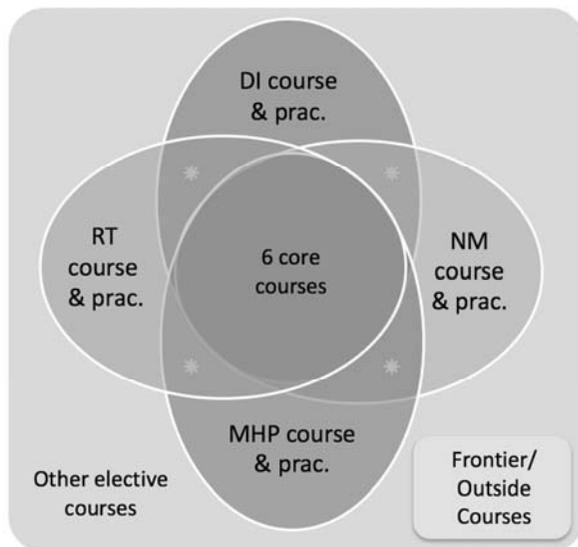
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Medical Physics Program Curriculum



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

<https://medicalphysics.duke.edu/programs>

Program Structure and Contents

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Plan A

(Full research)

Plan B

(Thematic research, Coursework)

- Entrance Assessment
- Qualifying Program
- Core Courses
- Thesis, Thematic Paper, Dissertation
- Internship, Fieldwork, Electives
- Exit Assessment

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Program Structure
GE
Core Courses
Specialise Courses
Electives
Senior project
Internship
Exit Assessment

Example

How does your programme structure and contents look like?

STRUCTURE

- One unique specific specialty, Clearly seen?
- One specific specialty with selected sub-specialty, Clearly seen? – Or Major? Why?
- Why Plan A? Why Plan B? Why Both?
- Study plan?

CONTENTS

- Sequence and integration, Clearly seen?
- Qualifying Programme needs? Why?
- Timeline for Senior project, Thesis? Start?, Why?

Curriculum Mapping: The Process

- Focused on **curriculum and program learning outcomes**
- Two-dimensional matrix representing **courses** on one axis and **outcomes** on the other
- Reflect **Backwards Curriculum Design**
- Identify **which courses address which learning outcomes**
- Indicate **Sequence and integration** of learning (all courses within the curriculum and ELOs)

แผนที่แสดงการกระจายความรับผิดชอบต่อผลการเรียนรู้จากหลักสูตรสู่รายวิชา

• ความรับผิดชอบหลัก ○ ความรับผิดชอบรอง

รายวิชา	1. คุณธรรม จริยธรรม					2. ความรู้				3. ทักษะทางปัญญา				4. ทักษะความสัมพันธ์ระหว่างบุคคลและความรับผิดชอบ				5. ทักษะการวิเคราะห์เชิงตัวเลข สื่อสาร และการใช้เทคโนโลยีสารสนเทศ							
	1	2	3	4	5	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	5	6	7	
1) หมวดวิชาสายทั่วไป																									
- กลุ่มวิชาวิทยาศาสตร์และคณิตศาสตร์																									
000211 ตรีสารตรีและของชีวเคมีในสี่ปีแรก	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
- กลุ่มวิชาสังคมศาสตร์																									
371111 การใช้ทรัพยากรท้องถิ่น	○	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
800141 อนุสรณ์กับสังคม	○	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
900901 เศรษฐศาสตร์เบื้องต้น (ฟรี)	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
932111 หลักการจัดการ (ฟรี)	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
934111 หลักการอาหาร	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
- กลุ่มวิชามนุษยศาสตร์																									
400271 จิตวิทยาสุขภาพการเบื้องต้น	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
800033 จิตวิทยาการดำเนินชีวิต	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
- กลุ่มวิชาภาษา																									
800021 ภาษาไทยเพื่อการสื่อสาร	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
255000 ภาษาอังกฤษ	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Curriculum Mapping of Courses and ELOs

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

Not recommended

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Curriculum matrix, example 1

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

No	Code	Course	Credit	Expected Learning Outcome (ELO)							
				ELO1	ELO2	ELO3	ELO4	ELO5	ELO6	ELO7	
27	CHS220802	Analytical Chemistry Lab.	1	5	5	1	1	1	1	5	1
28	CHS210801	Mass and Energy Balance	3	5	1	1	1	1	1	5	1
29	CHS210802	Transport Phenomena	3	5	1	3	5	1	1	5	1
30	CHS220804	Fluid Mechanics	3	5	1	1	5	1	1	5	1
31	CHS220805	Material Construction and Corrosion	3	5	1	1	1	1	1	4	3
32	CHS220806	Thermodynamics	3	5	1	1	1	1	1	5	5
33	CHS220807	Heat Transfer	3	5	1	1	1	1	1	5	5
34	CHS220801	Chemical Engineering Mathematics	3	5	1	1	5	1	1	5	1
35	CHS310802	Mass Transfer	4	5	1	2	5	1	1	5	1
36	CHS310803	Unit Operation Lab. 1	2	5	5	1	5	1	1	5	1
37	CHS320803	Unit Operation Lab. 2	2	5	5	1	5	1	1	5	1
38	CHS310804	Chemical Reaction Engineering	4	5	1	1	1	1	1	5	5
39	CHS310806	Process Control	3	5	1	5	1	1	1	5	1
40	CHS320801	Chemical Process Simulation	3	5	1	5	5	1	1	5	1
41	CHS320802c	Natural Gas Processing	3	5	1	4	5	1	1	5	5
42	CHS120801	Communication Skill	2	Note: The figures in the ELO column relate to:	1	1	1	1	1	5	5
43	CHS310805	Project Management	2	1 Not directly related to ELO	1	1	1	1	1	5	5
44	CHS320804	Research Methods	2	1 Not directly related to ELO	1	1	1	1	1	5	1
45	CHS400803	Capita Selecta	2	2 Quite related to ELO	1	1	1	1	1	5	4
46	CHS410801	Process Equipment Design	4	3 Related to ELO	5	1	1	1	1	5	5
47	CHS410802	Chemical Plant and Product Design	3	3 Related to ELO	5	5	5	5	5	5	5
48	CHS300805	Seminar	1	4 Closely related to ELO	5	4	5	5	5	5	5
49	CHS400801	On the Job Training	2	5 Specifically related to ELO	5	5	5	5	5	5	5
50	CHS400802	Final Project	4	5 Specifically related to ELO	5	5	5	5	5	5	5
51	CHF410801c	Composite Material	3	4	1	1	1	4	5	4	4
52	CHF410802	Applied Thermodynamics	3	5	1	3	1	1	1	4	4
53	CHF410803	Dynamic Systems	3	4	1	1	1	1	1	4	4

Source: Chemical Engineering, Universitas Indonesia

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QA at Programme Level

Curriculum map with educational taxonomy

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	COURSE	CR	LO1	LO2	LO3	LO4	LO5
Basic courses							
1	Subject 1	3	R			A	
2	Subject 2	3	R		A		
Intermediate courses							
3	Subject 3	3	R	A		A	
4	Subject 4	3	R			A	
Specialized courses							
5	Subject 5	3		A	A	E	E
6	Thesis	18		A	A	E	E

Bloom's Taxonomy R = Remembering / Understanding
A = Applying / Analyzing
E = Evaluating / Creating



Curriculum Map: Course matrix

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COURSES	ELO1	ELO2	ELO3	ELO4	ELO5
Core Courses					
MU 510			K1,K2,K3		
MU 520			SS1-GS1		
Specialize Courses					
MU 610					
MU 640					
MU 690			K4, SS2-GS2 A		
Fieldwork		SS1-9 / A		GS1-4 / A	
Thesis		SS1-9 / A		GS1-4 / A	



(3) Curriculum Map

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COURSES	LO1(K/S)	LO2(S/C)	LO3(RC)	LO4(GS)	LO5(GS)
MU 101	I	I	I	I	I
MU 102	I	I	I	I	I
MU 120	I	E	E	E	E
MU 121	E	E	E	E	E
MU 253		E	E	E	E
MU 241	E/A	M	M	M	M
MU 295	M/A	M/A	M/A	M/A	M/A
MU 296	A	A	A		

I = introduced; E = emphasized; M = mastered; A = assessed



(3) Curriculum Map

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3 SLOs

2 GLOs

S E Q U E N C E	COURSES	LO1(K/S)	LO2(S/C)	LO3(RC)	LO4(GS)	LO5(GS)
	MU 101	I	I	I	I	I
	MU 102	I	I	I		I
	MU 120	I	E			E
	MU 121	E				E
	MU 253				E	E
	MU 241	E/A	M	M	M	M
	MU 295	M/A	M/A	M/A	M/A	M/A
	MU 296	A	A	A		

Educational Taxonomy
(Level of Learning)
→ Integration

I = introduced; E = emphasized; M = mastered; A = assessed



Curriculum Map: Skill matrix

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A matrix identifies the knowledge and skills required to achieve ELOs

Skill/ knowledge	LO1(K/S)	LO2(S/C)	LO3(RC)	LO4(GS)	LO5(GS)
K1,K2,K3			I	I	
SS1,GS1			E	I	I
K4,SS2,GS2			E	E	E
THESIS			M/A	M/A	M/A
T&L			3,4,5	5	5
Summative Assessment			A	A	A



Ph.D. - Communication and Information Sciences program

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

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

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

(SLO2) Synthesize diverse data, theories, and methods

(SLO3) Demonstrate the ability to conduct research

(SLO4) Propose and conduct original research

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

Example
EX00



Your Time is Now..



Note to review your map

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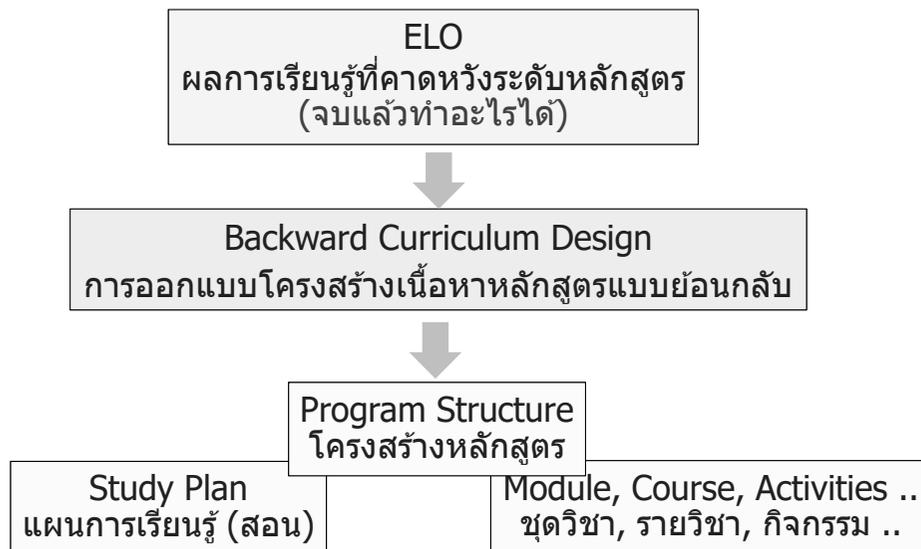
- How does the sequences and integration of the courses or modules structures?
- Do all the key courses address at least one outcome?
- Do multiple offerings of the same course address the same outcomes at the same levels?
- Do some outcomes get more coverage than others?

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ระดับหลักสูตร

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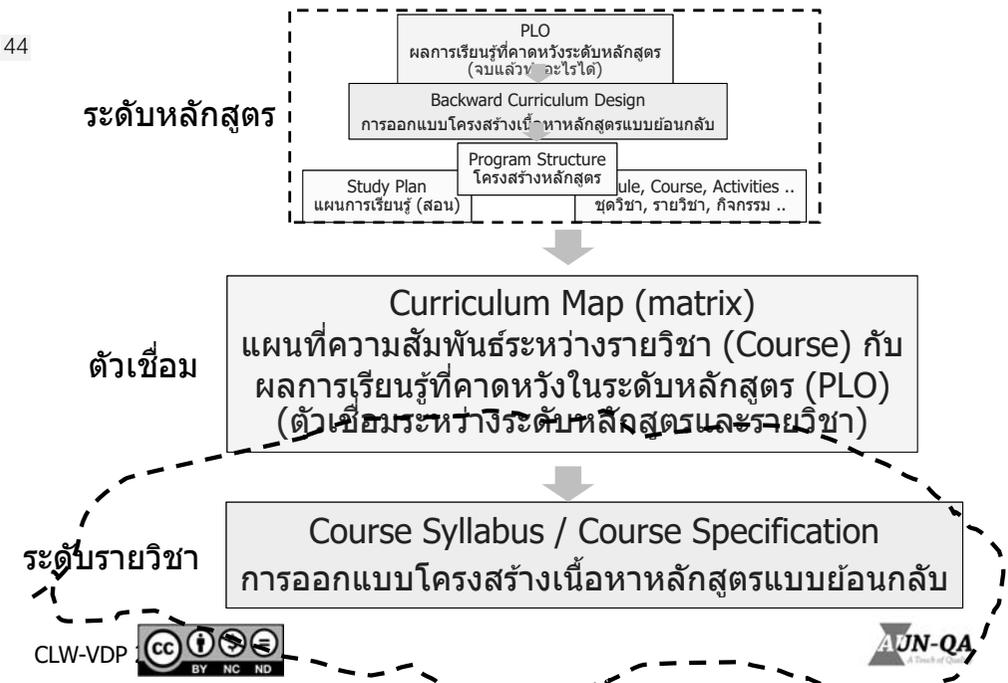


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ระดับรายวิชา (ชุดวิชา, กิจกรรม ..)

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5 Basic steps in a curriculum design based on OBE

1 Clearly defining the Expected Learning Outcomes

2 Backward Curriculum designed to align with ELOs

3 Construct Program Structure and Content that the sequence and integration are achieved.

4 Construct appropriate Course Syllabus that the alignment of CLOs with ELOs and constructive alignment of each course are achieved.

5 Review Program Constructive Alignment to ensure the ELOs can be achieved

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Development of Course Learning Outcomes (CLOs)

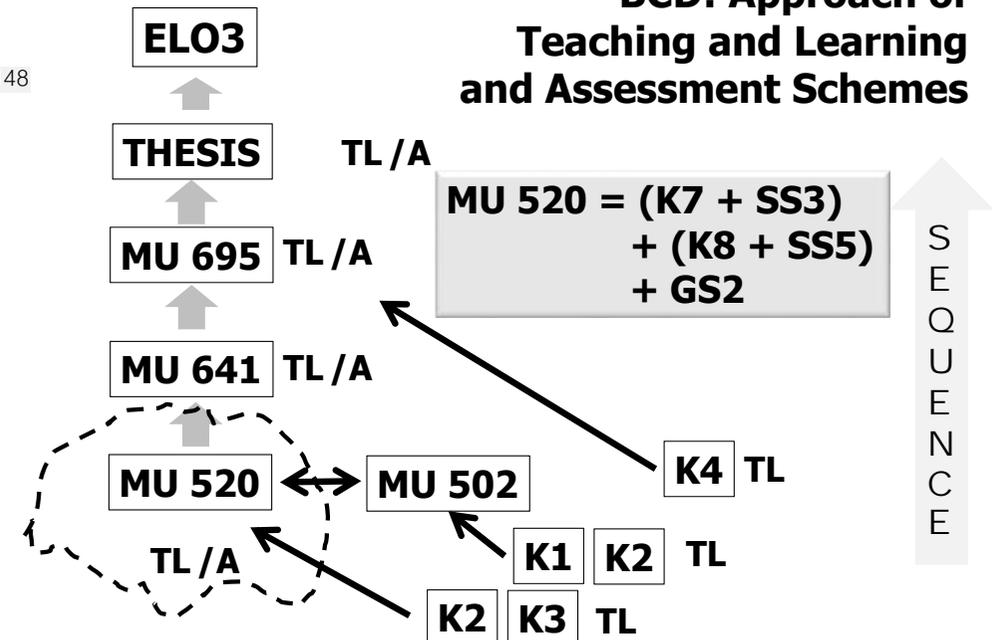
Curriculum Map: Course matrix

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

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BCD: Approach of Teaching and Learning and Assessment Schemes



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

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CLOs should be developed from CM and BCD

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



Constructive Alignment at course level

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

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

	Content	CLO No.	T/L Approach	Assessment Scheme
1				
2				
3				
4				



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Exercise 4: Formulation of Course Learning Outcomes



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Formulation of a course learning outcomes (CLOs)

Procedures:

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



Your Time is Now..



Homework

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

Next Workshop When?