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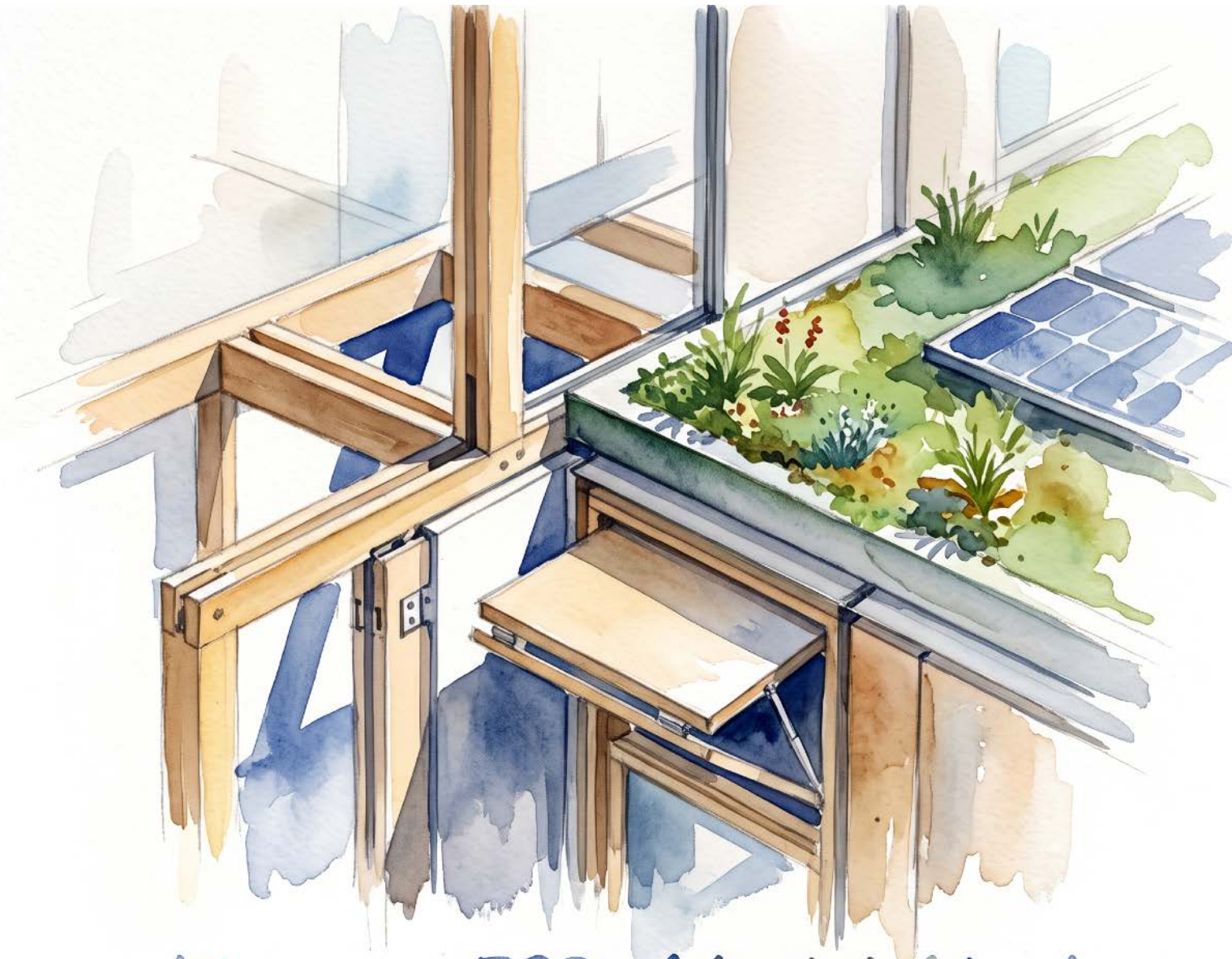
Pelaksanaan *Education for Sustainable Development (ESD)*, *Adaptability* dan *Flexibility* dalam Kurikulum UTM

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- Pekeliling MQA Bil. 5/2024 menetapkan penggunaan MQF Second Edition (2024), dengan tempoh transisi selama dua tahun bermula pada 1 Ogos 2024. Tempoh transisi tersebut telah berakhir pada 31 Julai 2026.
- MQF *Second Edition* (2024) memperkukuh *Global Sustainability Agenda* serta kemahiran peribadi di bawah *Cluster 4: Personal and Entrepreneurial Skills*.
- Oleh itu, kurikulum program perlu memberi perhatian kepada pelaksanaan ESD, *Adaptability* dan *Flexibility* secara terancang dan bersesuaian.





Mengapa ESD, Adaptability dan Flexibility Perlu Dilaksanakan?

01

Pembangunan Kompetensi Kelestarian

Kompetensi ESD yang bersesuaian perlu dibangunkan dalam kurikulum bagi menyokong *Global Sustainability Agenda*.

02

Pembangunan Kemahiran Peribadi

Adaptability dan *Flexibility* perlu dibangunkan sebagai elemen kemahiran peribadi di bawah Cluster 4: Personal and Entrepreneurial Skills.

03

Penjajaran Kurikulum

Pelaksanaannya perlu diujarkan dengan hasil pembelajaran program dan kursus, pengajaran dan pembelajaran serta pentaksiran, berdasarkan tahap kelayakan dan konteks program.

Kedudukan ESD serta *Adaptability* dan *Flexibility* dalam Kurikulum

Kedudukan dalam kurikulum



1. Education for Sustainable Development (ESD)

- Merangkumi lapan kompetensi utama ESD: *Systems Thinking, Anticipatory, Normative, Strategic Thinking, Collaboration, Critical Thinking, Self-Awareness* dan *Integrated Problem Solving*.
- Kompetensi ESD digunakan untuk menyokong penerapan agenda kelestarian dalam kurikulum.
- Kompetensi yang bersesuaian dipilih berdasarkan konteks disiplin dan tahap pengajian.

Kedudukan ESD serta *Adaptability* dan *Flexibility* dalam Kurikulum

Kedudukan dalam kurikulum

2. *Adaptability* dan *Flexibility*

- *Adaptability* dan *Flexibility* bukan sebahagian daripada lapan kompetensi utama ESD.
- Kedua-duanya merupakan elemen kemahiran peribadi yang berkaitan dengan *Cluster 4: Personal and Entrepreneurial Skills* dalam MQF *Second Edition* (2024).
- Pelaksanaannya hendaklah mengambil kira tahap kelayakan dan konteks program.
- Pemetaan dan pelaporan *Adaptability* dan *Flexibility* hendaklah dibezakan daripada kompetensi ESD



KERANGKA PELAKSANAAN ESD, *ADAPTABILITY* DAN *FLEXIBILITY* DALAM KURIKULUM



Nota: ESD, *Adaptability* dan *Flexibility* boleh dipaparkan dalam jadual atau tempat yang sama, tetapi kategorinya hendaklah dibezakan dengan jelas.

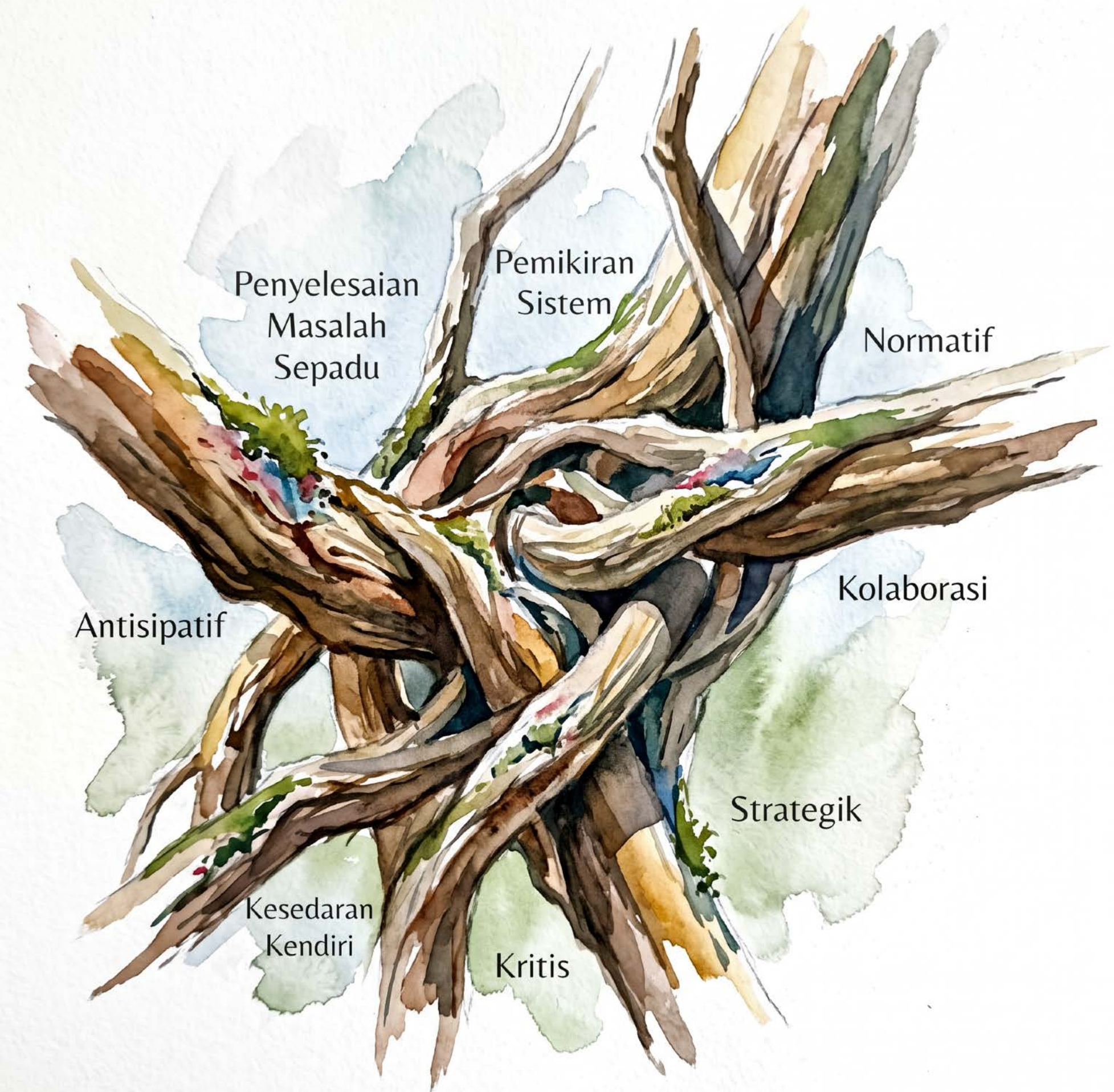
Keperluan Pelaksanaan dalam Kurikulum

1. Kompetensi ESD

Kompetensi ESD yang bersesuaian hendaklah dikenal pasti berdasarkan tahap kelayakan dan konteks disiplin.

Kompetensi tersebut hendaklah diujarkan dengan PLO, CLO dan kursus yang berkaitan.

Pelaksanaannya hendaklah disokong melalui kandungan kursus, aktiviti pengajaran dan pembelajaran, pentaksiran serta bukti pencapaian pelajar.



Keperluan Pelaksanaan dalam Kurikulum

2. *Adaptability dan Flexibility*

Adaptability dan Flexibility hendaklah diajarkan dengan PLO, CLO dan kursus yang bersesuaian berdasarkan tahap kelayakan serta konteks program.

Pelaksanaannya hendaklah disokong melalui kandungan kursus, aktiviti pengajaran dan pembelajaran, pentaksiran serta bukti pencapaian pelajar.



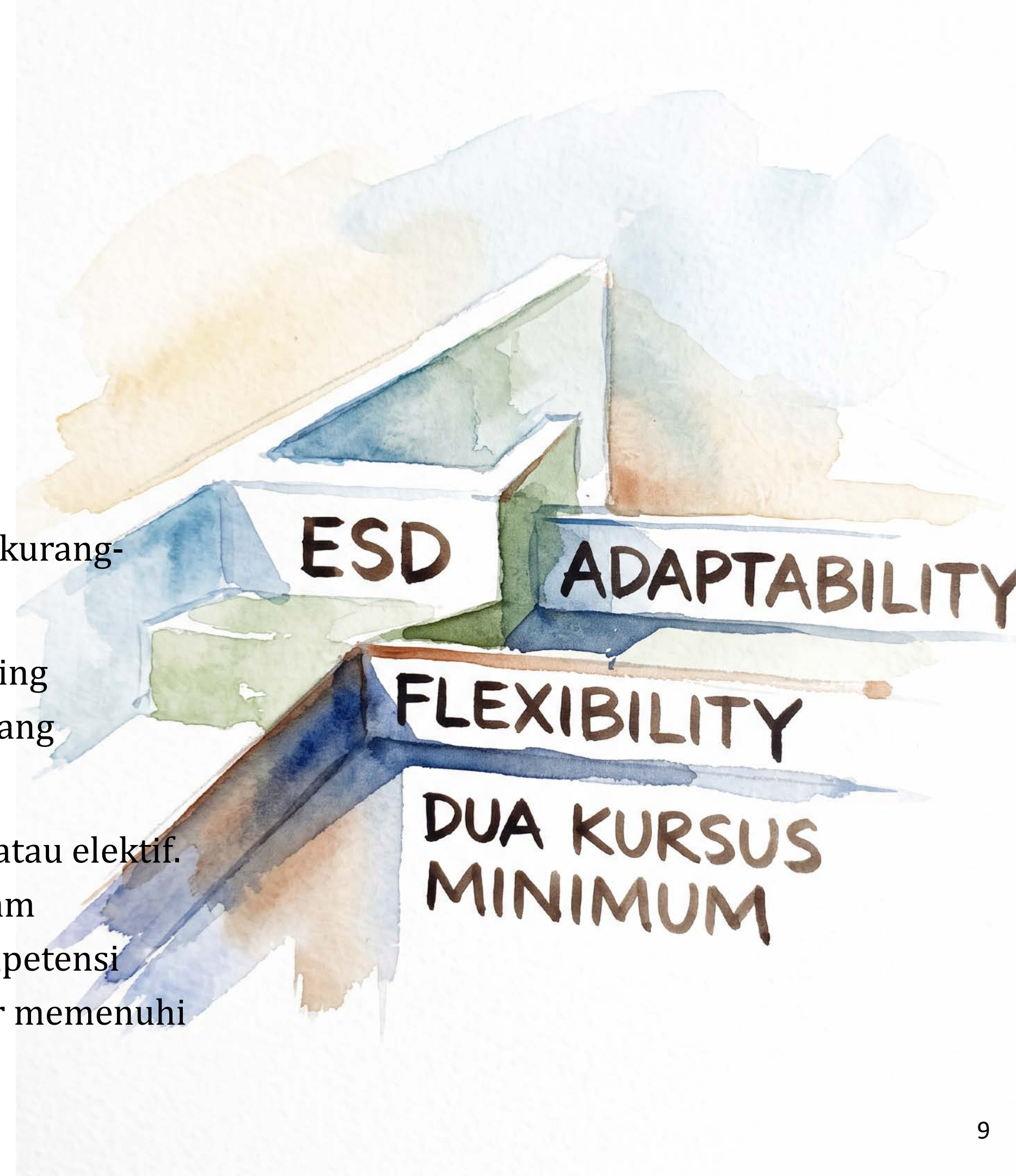
Keperluan Pelaksanaan dalam Kurikulum

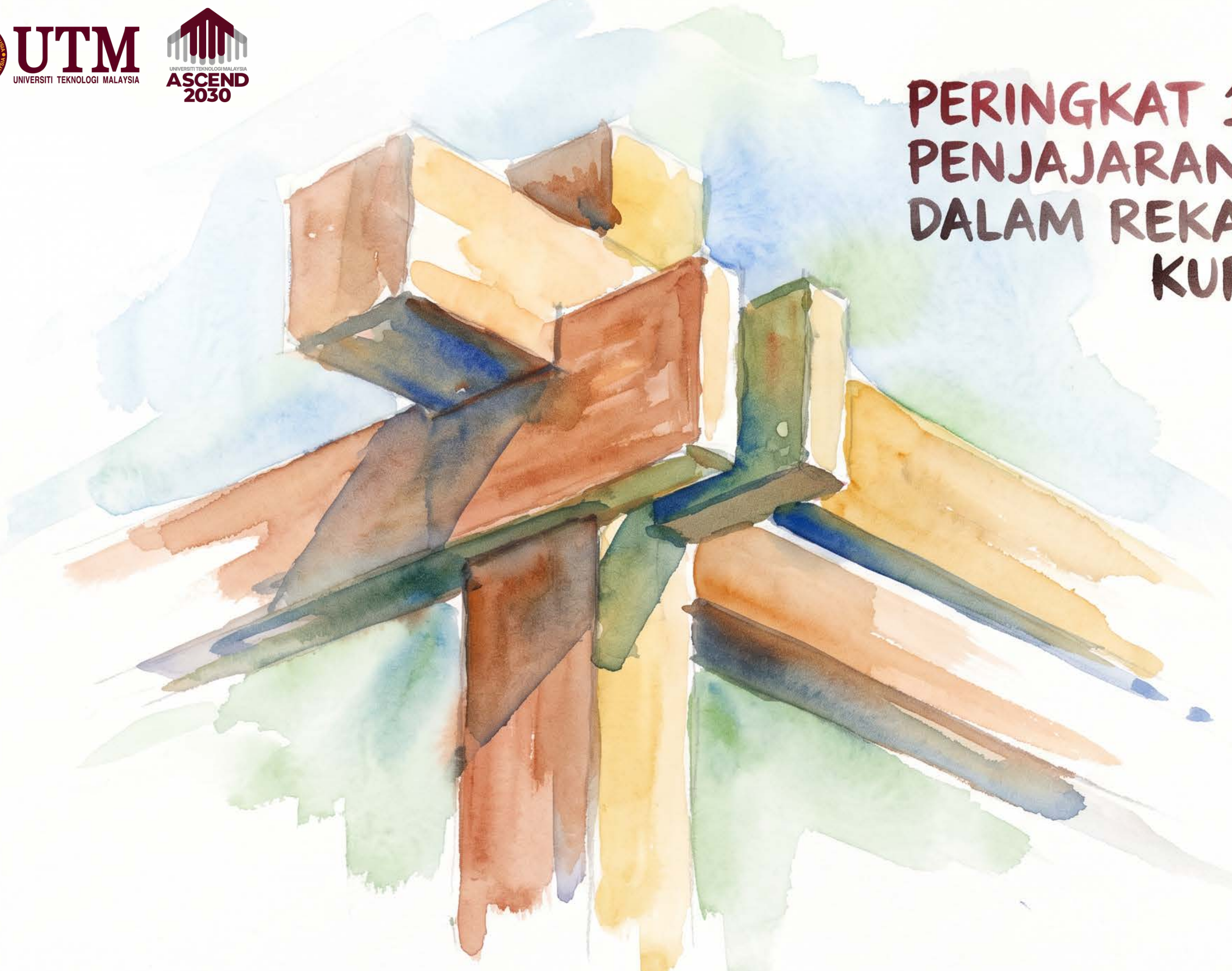
3. Keperluan minimum pemetaan kursus

Setiap kompetensi ESD hendaklah dipetakan kepada sekurang-kurangnya **DUA KURSUS** yang bersesuaian.

Adaptability dan *Flexibility* juga hendaklah masing-masing dipetakan kepada sekurang-kurangnya **DUA KURSUS** yang bersesuaian.

DUA KURSUS boleh terdiri daripada kursus teras dan/atau elektif. Jika kursus elektif digunakan, semua kursus elektif dalam kelompok yang sama hendaklah dipetakan kepada kompetensi atau elemen yang sama bagi memastikan semua pelajar memenuhi keperluan tersebut.





PERINGKAT 1: PENJAJARAN DALAM REKA BENTUK KURIKULUM

Penjajaran Kompetensi ESD serta Adaptability dan Flexibility dalam Reka Bentuk Kurikulum

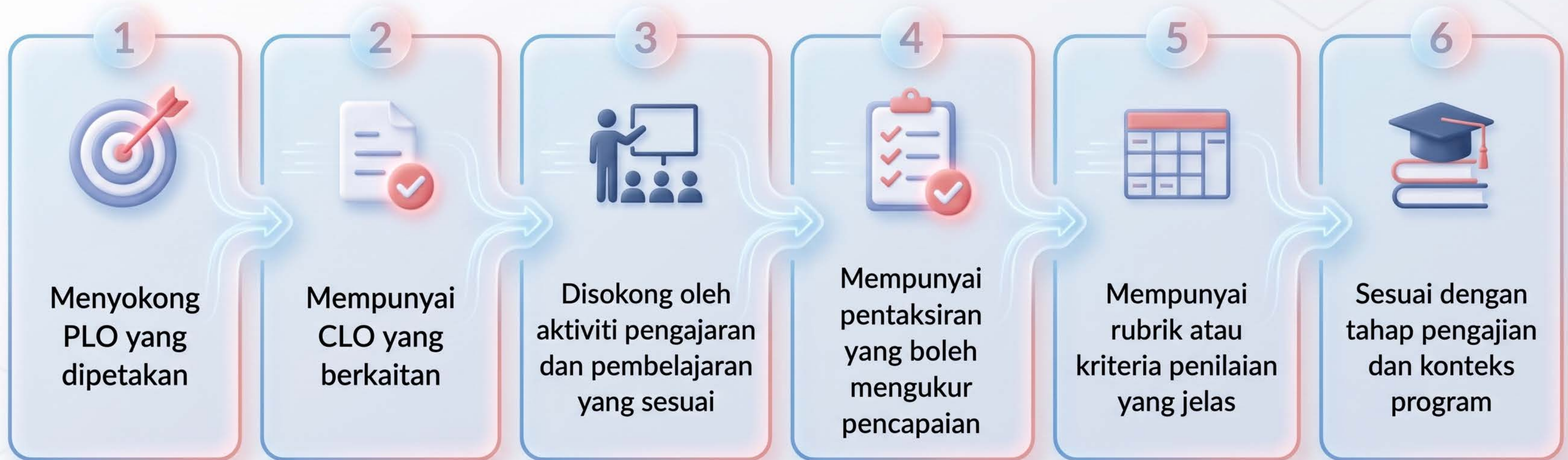


Nota: Pemetaan hendaklah dibuat berdasarkan kesepadanan yang jelas antara kompetensi atau elemen dengan PLO, CLO dan kursus yang berkaitan.

PERINGKAT 2: KRITERIA PEMILIHAN KURSUS

Kriteria Pemilihan Kursus bagi Pemetaan

Kursus yang dipilih hendaklah menunjukkan kesepadanan yang jelas dengan keperluan pemetaan pada peringkat program dan kursus.



**Mesej
Utama**

Tidak semua kursus perlu dipetakan. Hanya kursus yang menunjukkan kesepadanan yang jelas perlu dipilih.



PERINGKAT 3: PELAKSANAAN & PENTAKSIRAN

Pelaksanaan dan Pentaksiran pada Peringkat Kursus



Pada peringkat kursus, pelaksanaan hendaklah menunjukkan penjajaran yang jelas antara **CLO, aktiviti pengajaran dan pembelajaran, pentaksiran, rubrik atau kriteria penilaian** serta pencapaian pelajar.

1



CLO yang Berkaitan

CLO hendaklah jelas, boleh diukur dan selaras dengan kompetensi atau elemen yang ditetapkan.

2



Aktiviti Pengajaran dan Pembelajaran

Aktiviti pembelajaran hendaklah menyokong pembangunan kompetensi atau elemen yang berkaitan.

3



Pentaksiran

Kaedah pentaksiran hendaklah mengukur pencapaian CLO serta kompetensi atau elemen yang ditetapkan.

4



Rubrik atau Kriteria Penilaian

Rubrik atau kriteria penilaian hendaklah jelas dan sesuai dengan aspek yang dinilai.

5



Pencapaian Pelajar

Pencapaian pelajar dianalisis bagi menunjukkan tahap penguasaan dan menyokong penambahbaikan berterusan (CQI).



Mesej Utama

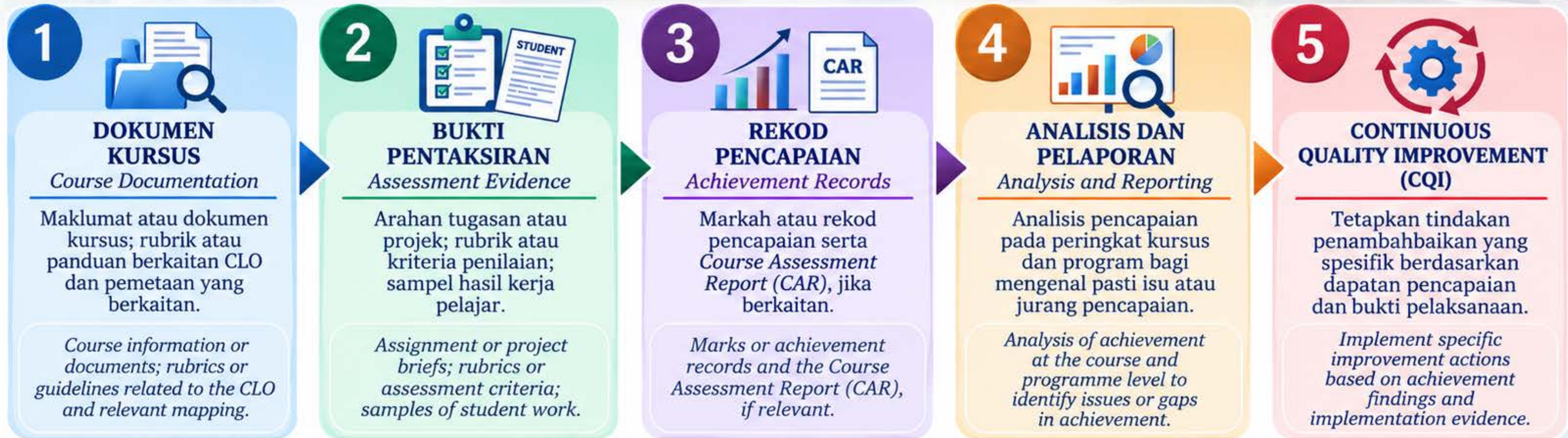
Setiap pemetaan hendaklah dapat ditunjukkan melalui CLO, aktiviti pengajaran dan pembelajaran, pentaksiran, rubrik atau kriteria penilaian serta pencapaian pelajar.

**PERINGKAT 4:
BUKTI PELAKSANAAN,
ANALISIS & CQI**

Bukti Pelaksanaan dan Continuous Quality Improvement (CQI)

Implementation Evidence and Continuous Quality Improvement (CQI)

Bukti pelaksanaan hendaklah disimpan secara tersusun dan boleh disemak.
Implementation evidence should be systematically stored and verifiable.



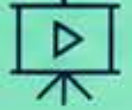
MESEJ UTAMA KEY MESSAGE

Bukti Pelaksanaan → Analisis Pencapaian → Tindakan CQI → Penambahbaikan Pelaksanaan.
Implementation Evidence → Analysis of Achievement → CQI Actions → Improved Implementation.



CQI boleh melibatkan penambahbaikan arahan tugas, aktiviti pengajaran dan pembelajaran, kaedah pentaksiran, rubrik atau kriteria penilaian serta penjajaran CLO.
CQI may involve improvements to assignment briefs, teaching and learning activities, assessment methods, rubrics or assessment criteria, and the alignment of CLOs.

Contoh Penjajaran PLO, Kompetensi ESD, Adaptability, Flexibility dan Definisi Operasional: Bachelor of Science in Physics with Honours

KLUSTER HASIL PEMBELAJARAN MQF / PLO	KOMPETENSI ESD (Pendidikan untuk Pembangunan Lestari)	DEFINISI OPERASIONAL (Konteks Program Fizik)	KLUSTER HASIL PEMBELAJARAN MQF / PLO	KOMPETENSI ESD (Pendidikan untuk Pembangunan Lestari)	DEFINISI OPERASIONAL (Konteks Program Fizik)
 PLO1 Knowledge & Understanding	➤ Systems Thinking	Identifying and analysing relationships among physical principles and systems, and connecting them to broader real-world contexts.	 PLO7 Numeracy Skills	➤ Critical Thinking	Interpreting and critically evaluating numerical and graphical information to draw accurate and appropriate conclusions.
 PLO2 Cognitive Skills	➤ Critical Thinking	Critically examining physics-related information to generate physics insights.	 PLO8 Leadership, Autonomy and Responsibility	➤ Strategic Thinking	Planning and implementing appropriate actions to achieve goals and milestones.
	➤ Integrated Problem-solving	Integrating physics knowledge and relevant approaches to solve problems.		➤ Collaboration	Working with and leading others towards common goals.
				➤ Self-awareness	Reflecting on personal roles, responsibilities and accountabilities to enhance self-development.
 PLO3 Practical Skills	➤ Integrated Problem-solving	Integrating experimental, computational and analytical approaches to solve physics-related problems.	 PLO9 Personal Skills	➤ Anticipatory	Anticipating possible future outcomes and risks of physics-related actions and decisions.
				➤ Self-awareness	Reflecting on one's role, actions and personal inclinations.
				➤ Adaptability	Responding effectively to new physics-related situations, data or constraints.
				➤ Flexibility	Adjusting methods and approaches when conditions or requirements change.
 PLO4 Interpersonal Skills	➤ Collaboration	Working with, learning from and contributing to individuals, teams and communities.	 PLO10 Entrepreneurial Skills	➤ Anticipatory	Anticipating possible future outcomes and risks of physics-related actions and decisions.
				➤ Strategic Thinking	Planning and implementing appropriate actions to achieve strategic goals.
				➤ Adaptability	Responding effectively to new physics-related situations, data or constraints.
				➤ Flexibility	Adjusting methods and approaches when conditions or requirements change.
 PLO5 Communication Skills	➤ Collaboration	Communicating and exchanging physics-related ideas to engage and collaborate with others.	 PLO11 Ethics and Professionalism	➤ Normative	Evaluating physics-related actions and decisions based on ethical principles, and acting in accordance with them.
 PLO6 Digital Skills	➤ Integrated Problem-solving	Integrating digital tools, information and technology applications to solve physics problems.			

Contoh Penjajaran PLO, Kompetensi ESD, Adaptability, dan Flexibility

Bachelor of Science in Physics with Honours

PLO MQF2.0 (MQF Cluster Codes)	ST	AT	N	STT	C	CT	SA	IPS	A	F
PLO1 (C1)	✓									
PLO2 (C2)						✓		✓		
PLO3 (C3A)								✓		
PLO4 (C3B)					✓					
PLO5 (C3C)					✓					
PLO6 (C3D)								✓		
PLO7 (C3E)						✓				
PLO8 (C3F)				✓	✓		✓			
PLO9 (C4A)		✓					✓		✓	✓
PLO10 (C4B)		✓		✓					✓	✓
PLO11 (C5)			✓							

i Nota: Adaptability dan Flexibility hanya dipetakan kepada PLO9 (C4A) dan PLO10 (C4B) di bawah Cluster 4.

PETUNJUK SINGKATAN KOMPETENSI:

- ST

Systems Thinking
- AT

Anticipatory
- N

Normative
- STT

Strategic Thinking
- C

Collaboration
- CT

Critical Thinking
- SA

Self-awareness
- IPS

Integrated Problem-solving
- A

Adaptability
- F

Flexibility

Contoh Pemetaan Course-PLO

Bachelor of Science in Physics with Honours

Course Sem 1	PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11
	PLO Category (D / G)	D	D	D	G	G	G	D	G	G	G	G
	Domain	C	C	P	A	A	A	C	A	A	A	A
ULRS 1012 Malaysian Citra						✓				✓		
SSCP 1143 Mechanics		✓	✓									
SSCP 1153 Electricity and Magnetism		✓	✓									
SSCP 1811 Practical Physics I				✓		✓						
SSCM 1023 Mathematical Methods I			✓					✓				
SSCP 1102 Introduction to Physics Programme						✓					✓	

Course Sem 2	PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11
	PLO Category (D / G)	D	D	D	G	G	G	D	G	G	G	G
	Domain	C	C	P	A	A	A	C	A	A	A	A
ULRS 1032 Integrity and Anti-corruption Course									✓			✓
SSCP 1163 Sound, Wave and Optics		✓	✓									
SSCP 1223 Modern Physics		✓	✓									
SSCM 1523 Linear Algebra			✓					✓				
SSCM 1033 Mathematical Methods II			✓					✓				
SSCP 1821 Practical Physics II				✓		✓						



D = Discipline-specific; G = Generic; C = Cognitive;
P = Psychomotor; A = Affective.



✓ menunjukkan penjajaran kursus kepada PLO.

Contoh Pemetaan Kursus, Kompetensi ESD, Adaptability dan Flexibility

Bachelor of Science in Physics with Honours | Berdasarkan pemetaan Course–PLO terkini

Maklumat Kursus				Kompetensi ESD (UNESCO)								MQF 2024 – Personal Skills (Cluster 4)	
Tahun	Sem	Kod Kursus	Nama Kursus	ST	AT	N	STT	C	CT	SA	IPS	A	F
1	1	SSCP 1143	Mechanics	✓									
1	1	SSCP 1153	Electricity and Magnetism						✓				
1	1	SSCP 1811	Practical Physics I					✓					
1	1	SSCM 1023	Mathematical Methods I								✓		
1	1	SSCP 1102	Introduction to Physics Programme		✓								
1	2	SSCP 1163	Sound, Wave and Optics	✓									
1	2	SSCP 1223	Modern Physics						✓				
1	2	SSCM 1523	Linear Algebra								✓		
1	2	SSCM 1033	Mathematical Methods II						✓				
1	2	SSCP 1821	Practical Physics II					✓					
TOTAL				2	1	0	0	2	3	0	2	0	0

ST = Systems Thinking; AT = Anticipatory; N = Normative; STT = Strategic Thinking; C = Collaboration; CT = Critical Thinking; SA = Self-awareness; IPS = Integrated Problem-solving; A = Adaptability; F = Flexibility.

What is a CLO?

Course Learning Outcomes



Definition

CLOs state the learning outcomes that students are expected to achieve at the end of a course.

Key Points

01



More Specific Than PLOs

CLOs are more specific than PLOs.

02



Linked to Course Design

CLOs must be related to course content, learning activities, and course assessment.

03



Contribute to PLOs

Each CLO should contribute to the relevant PLO.

04



Not All PLOs in One Course

Not all PLOs need to be achieved in a single course.



Quick Takeaway

A good CLO is specific, course-based, aligned with learning activities and assessment, and contributes to the relevant PLO.



S.M.A.R.T FRAMEWORK

Doran (1981)



The SMART framework is a **widely used tool for setting clear and effective goals**. It is commonly applied in education, business, project management, and performance evaluation.



In the context of Course Learning Outcomes (CLOs), the SMART framework helps educators ensure that:



Learning outcomes **clearly describe** what students will achieve.

01



Learning outcomes **can be assessed**.

02



Learning outcomes are **realistic and relevant** to the program/course.

03



Learning outcomes are **expected to be achieved** within the course duration.

04



Reference: Doran, G. T. (1981). There's a SMART way to write management's goals and objectives. *Management review*, 70(11).

S.M.A.R.T

FRAMEWORK

Doran (1981)



The SMART framework is a **widely used tool for setting clear and effective goals**. It is commonly applied in education, business, project management, and performance evaluation.



In the context of Course Learning Outcomes (CLOs), the SMART framework helps educators ensure that:

01



SPECIFIC

The CLO should clearly state what the student is expected to learn or do.

02



MEASURABLE

The CLO should be assessable through assignments, tests, projects, or other evaluation methods.

03



ACHIEVABLE

The CLO should be realistic based on the time, resources, and level of students.

04



RELEVANT

The CLO must align with the course aim, programme learning outcomes (PLO), and current industry or academic needs.

05



TIME-BOUND

The CLO should be achievable within the duration of the course.

ALIGNING CLOs WITH PLOs USING MQF LEVELS

THE IMPORTANCE OF ALIGNMENT

1



CONTRIBUTES TO PROGRAMME LEARNING OUTCOMES

Ensures every course supports the programme's overall goals.

2



LEARNING OUTCOME CONSISTENCY

Promotes uniformity in student learning outcomes.

ALIGNMENT PROCESS: 3 EASY STEPS

1

IDENTIFY RELEVANT PLOs

Match each CLO with the programme learning outcome (PLO) it supports.



2

REFER TO MQF LEVEL DESCRIPTORS

Use MQF guidelines to ensure the correct level of CLO complexity.



3

VALIDATE ALIGNMENT

Check that CLOs collectively cover all targeted PLOs.



1. KNOWLEDGE & UNDERSTANDING	Cognitive
2. COGNITIVE SKILLS	Cognitive
3. FUNCTIONAL WORK SKILLS	Cognitive Psychomotor Affective
- Practical Skills - Interpersonal Skills - Communication Skills - Digital Skills - Numeracy Skills - Leadership, Autonomy & Responsibility	
4. PERSONAL & ENTREPRENEURIAL SKILLS	Affective
- Personal Skills - Entrepreneurial Skills	
5. ETHICS & PROFESSIONALISM	Affective
	Cognitive Psychomotor Affective

Writing ESD-Based CLOs

Clear, measurable Course Learning Outcomes for Value-Based Education

At the end of the course, students should be able to:



Action Verb

+



Learning Content

+



Context or Standard

Example of ESD-Based CLO

Course: Practical Physics II



CLO3

Report experimental findings as a team with mutual respect, inclusivity and shared responsibility in group laboratory work.



T&L Methods

- Team-based laboratory work with rotating roles (leader, experimenter, recorder, presenter)
- Structured group discussion on results that values every member's input
- Collaborative report writing with shared division of tasks
- Guided peer feedback



Assessment Methods

- Group laboratory report (rubric with teamwork criteria)
- Peer evaluation form
- Team contribution log
- Lecturer observation checklist on teamwork and collegiality



Rubrics / Criteria

Report criteria

Structure, procedure clarity, data/graph presentation, results and findings, scientific language

Collaboration criteria

Contribution, coordination, team communication, accountability



Evidence of Achievement

- Group laboratory report
- Report rubric score
- Collaboration rubric / lecturer observation record
- Peer assessment record, if used
- Team contribution log



Course: Practical Physics II



Year / Semester: Year 2, Semester 1



PLO: PLO5 (C3C Communication Skills)



ESD: Collaboration

Dominant learning domain for each learning outcome

LEARNING OUTCOME CLUSTERS		LEARNING OUTCOME DOMAIN	*DOMINANT LEARNING DOMAIN
1	Knowledge and Understanding	Knowledge and Understanding	Cognitive
2	Cognitive Skills	Cognitive Skills	Cognitive
3	Functional Work Skills	Practical Skills	Psychomotor
		Interpersonal Skills	Affective
		Communication Skills	Affective
		Digital Skills	Cognitive / Psychomotor / Affective
		Numeracy Skills	Cognitive
		Leadership, Autonomy and Responsibility	Affective
4	Personal and Entrepreneurial Skills	Personal Skills	Affective
		Entrepreneurial Skills	Affective
5	Ethics and Professionalism	Ethics and Professionalism	Affective

Contoh Pelaksanaan ESD di Peringkat Kursus: Practical Physics II



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No.	CLO	PLO (MQF Cluster Code)	MQF 2.0 Taxonomies & Graduate Attributes	ESD	VBE	T&L Methods	Assessment Methods
CLO1	Measure basic physical quantities such as length, mass, time, current and voltage using standard laboratory instruments with appropriate precision and uncertainty estimation.	PLO3 (C3A)	P4 SC3	-	-	Demonstration of instrument use; supervised hands-on practical; guided measurement practice with uncertainty estimation	Lecturer observation (practical skills rubric); laboratory record / worksheet
CLO2	Assemble experimental set-ups for mechanics, optics and electricity experiments according to given procedures and laboratory safety practices.	PLO3 (C3A)	P4 SC3	-	-	Demonstration of set-up; laboratory safety briefing; supervised hands-on practical; guided practice	Lecturer observation; practical test with set-up checklist
CLO3	Report experimental findings as a team with mutual respect, inclusivity and shared responsibility in group laboratory work.	PLO5 (C3C)	A3 A (SI4)	C	Synergy	Team-based laboratory work with rotating roles (leader, experimenter, recorder, presenter); structured group discussion on results that values every member's input; collaborative report writing with shared division of tasks; guided peer feedback	Group laboratory report (rubric with teamwork criteria); peer evaluation form; team contribution log; lecturer observation checklist on teamwork and collegiality

Course: Practical Physics II

Year / Semester: Year 2, Semester 1

PLOs: PLO3 (C3A Practical Skills), PLO5 (C3C Communication Skills)

ESD: Collaboration

At the end of the course, students should be able to:

Structure: **Action Verb** + **Learning Content** + **Context or Standard**

