

C2C to OBE:

Approach Teaching and Learning and Assessment Schemes to aligning with ELOs and CLOs in Curriculum Design



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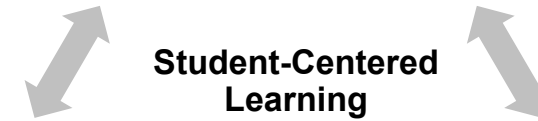


OBE Concept

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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.

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Constructive Alignment

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Programme Goals



Educational philosophy
can be defined as a set of related beliefs that influences what and how students should be taught
(T/L approach)



Programme T&L and Assessments

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Educational Philosophy (NUS)

NUS Educational Philosophy

The NUS community of students, teachers, and administrators, seeks to help students become individuals with **questioning** minds, willing and able to examine what is taken for granted, and who engage in rigorous inquiry within and beyond assumed disciplinary borders; individuals of **well-rounded** mind and character; **constructive and responsible** members of a community, ready to assume leadership and conscious of the impact of their activities on others; **global citizens**, who are sensitive to diverse cultural settings, aware of the potential they offer, and capable of operating in them, while conscious of the particularity, value, and limits of their own perspectives; bearers of a **resourceful and enterprising** spirit, in public and private life; and able **communicators** who can articulate and defend ideas effectively. The University seeks to inculcate students with the above qualities through both formal and informal education that extends from the classroom environment to a larger institutional culture outside the classroom. The latter includes the myriad learning opportunities in residential living.

NUS recognizes its distinctive educational role as a university with both an **Asian and international identity**. This unique position creates the possibility of equally unique perspectives, and allows the University to retain a global outlook while drawing from and reflecting upon the character and resources of the region.

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Source: <http://www.nus.edu.sg/registrar/edu.html>

Educational Philosophy (DLSU)

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Source: <http://www.dlsu.edu.ph/offices/osa/cao/>



<https://www.cs.washington.edu/education/philosophy>

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What is your Educational philosophy?

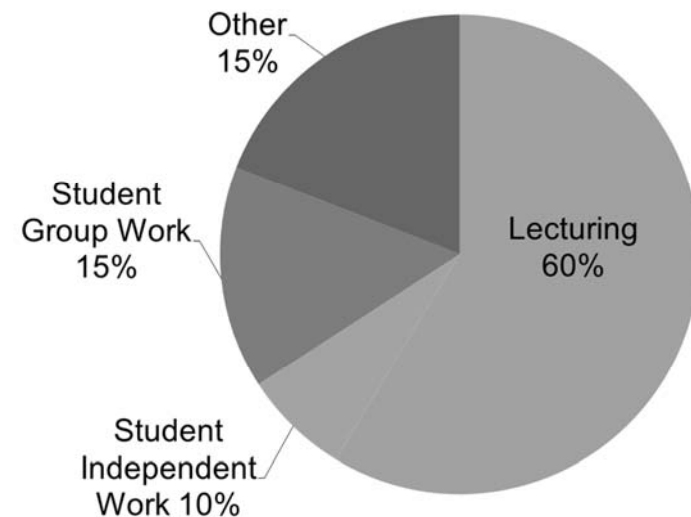
Educational philosophy can be defined as a set of related beliefs that influences what and how students should be taught
(T/L approach)

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How Do You Spend In-Class Time



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Research indicates that **individuals retain** about:

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- 10% of what they **read**
- 20% of what they **hear**
- 30% of what they **see**
- 50% of what they **both hear and use**
- 70% of what they **say**
- 90% of what they **say and do**



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Teaching approaches

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- **Transmissive teaching** – Knowledge and skills presented to student → Teaching as transmission reflects more **behaviorist learning theories**
- **Transactional teaching**– Students actively engaged in their learning → Teaching as transaction is rooted in more **constructivist perspectives**
- **Transformative teaching** – Students form their own understanding about the learning → **Whole-person**



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Teaching as transmission

- 11 Teaching as transmission puts the instructor at the center of the learning process. The **instructor delivers information and the student receives it**. In this view of teaching, a **well-worded explanation is seen as having the most impact** on student learning.
- Teaching as transmission **reflects more behaviorist learning theories**
- While this mode of teaching is still highly regarded by both students and instructors, there is growing evidence that **questions its effectiveness**.



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Teaching as transaction

- 12 In a transactional learning environment, **learning happens through interactions with people and experiences**.
- Teaching as transaction is **rooted in more constructivist perspectives**.
- Learners build their understanding of content** by interacting with activities and through social meaning-making processes with their peers and their instructors. Instead of delivering information, **instructors work to plan experiences that can help their students learn and work with them** to foster their understanding.



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Teaching as transformation

- 13 Transformational teaching represents an attempt to “increase students’ mastery of key course concepts while transforming their learning-related attitudes, values, beliefs, and skills.” We believe that to be transformational in nature, teaching must enhance students’ mastery of course concepts, their learning-related skills, and their disposition toward learning. Without all three of these components, the approach would seem to fall within the constraints of traditional classroom instruction (i.e., if it only focuses on mastering course content or on acquiring skills), or motivationally guided personal exploration (i.e., if it only focuses on examining or enhancing attitudes, values, or beliefs).

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Teaching as transformation

- 14 Transformational teaching goes **beyond passive learning**; it also goes **beyond active learning**.
The **teacher is conceptualized** as an instructor of the relevant material and **also as a change agent** who guides students through the transformational process.
In his or her role as change agent, the teacher works to **decrease students’ perceived barriers to success while increasing their self-efficacy for change**.
Teaching centers on the use of self-change activities or projects but requires previous mastery of the course concepts via other teaching methods.
Students are viewed as being **capable of mastering the course content** and **achieving the targeted changes**.

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Teaching Methods

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- Direct instruction
- Indirect instruction
- Interactive instruction
- Experiential learning
- Independent study

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Direct instruction

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- Teacher directed
- Transmissive learning
- Strategies/Methods include
 - Lecture
 - Explicit teaching
 - Structured overview
 - Compare and contrast
 - Didactic questions
 - Demonstration
 - Guides for reading, listening, viewing
 - Activating prior knowledge – cues, questions, advance organizers



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Indirect instruction

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- Teacher planned
- More student involvement – student not just a passive listener
- Moving from Transmissive to Transactive and Transformative
- Strategies/Methods include
 - Problem-solving
 - Document analysis
 - Case studies
 - Summarizing and note taking
 - Reading for meaning
 - Reflective discussion

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Interactive instruction

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- Teacher or student designed
- Students interact with other students, guests, peers, community members, others
- Transactive and transformative
- Strategies/Methods include:
 - Debates, Role playing, Panels
 - Brainstorming, Peer practice
 - Discussion, Lab groups
 - Problem solving/Study groups
 - Tutorial groups
 - Group research projects
 - Interviewing

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Experiential learning

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- Teacher/Student planned
- Student involved in simulated or real life experiences
- Transaction and transformative
- Strategies/Methods include:
 - Role playing
 - Field trips
 - Conducting experiments
 - Generating and testing hypothesis
 - Simulations
 - Games
 - surveys

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Independent study

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- Student works independently
- Teacher may give assistance if needed
- Transmissive, transactive and transformative
- Strategies/Methods include:
 - Computer Assisted Instruction
 - Distance education
 - Essays/Reports
 - Learning activity package
 - Correspondence lessons
 - Homework
 - Independent research projects



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Teaching and Learning Approach

Strategies	Strengths	Weaknesses
21 Direct Instruction	Tends to benefit auditory learners	Shorter attention span of passive listeners
Indirect Instruction	Promotes meaningful understanding and ownership of learning	Time consuming
Experiential Learning	Engaging, facilitates transfer of knowledge and skills, first hand impactful experience	Risks being artificial or superficial in terms of learning quality
Interactive Instruction	Motivating for students. Interact with others broadens the educational experience	Dependent upon the expertise of the teacher in structuring and developing the dynamics of the group
Independent Study	Learn on demand. User is able to stop for breaks. Tutorials can be developed by experts outside the institution	Not possible to ask questions in the absence of the instructor. Individuals must be motivated enough to complete tutorial

QA at Programme Level

IT'S YOUR CHOICE...

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You decide which **approach** and which **strategy** will work best for the given situation – the needs of the learner, the nature of learning outcome and resources you have available.

Remember

Time is a resource – you will need to consider the time it takes for some strategies – Is the time it takes worth the end result?

IT'S YOUR DECISION

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Definition - Learning

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1. Learning is a process, not a product
2. **Learning is a change in knowledge, beliefs, behaviours or attitudes**
Takes time; especially with changes to core beliefs, behaviours, and attitudes
3. **Learning is not something done to students, but something that students themselves do**

Agreement that it is an active process and teaching needs to support active engagement

Constructivist

Learners make their own meaning

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Constructivism

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<https://youtu.be/Xa59prZC5gA>

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Behaviorism

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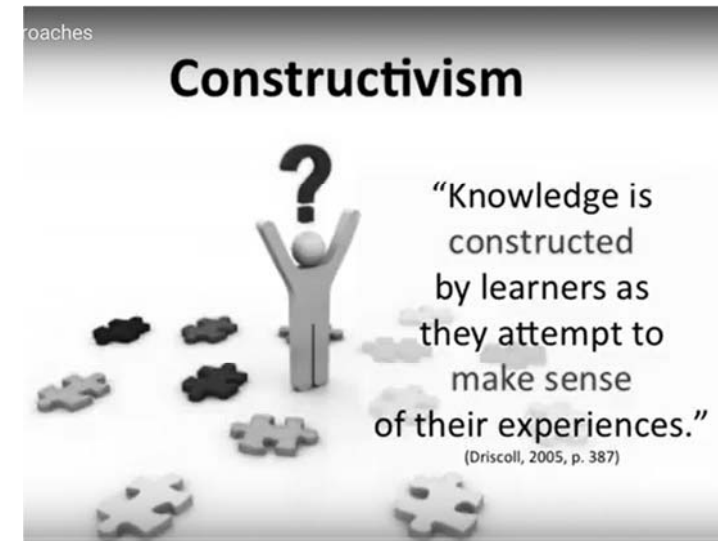
<https://youtu.be/KYDYzR-ZWRQ>



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Constructivist Approaches

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<https://youtu.be/krqjqGluC-A>



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Constructivist Learning Theories

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- **Students are now learners** who come to the classroom **with their unique** backgrounds, experience, conceptual understanding, learning styles and personal circumstances.
- **Teachers now become learning facilitators** rather than reservoirs of knowledge.
- Psychology of **learning has shifted from behaviorism to cognitivism to constructivism.**
- It is the models that the **teacher should be questioning**, not the students.



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Role of technologies

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- Role should be changed from that of **technology-as-teacher to technology-as-partner** in the learning process
- Technologies should be **used as engagers and facilitators** of thinking and knowledge construction.
- Students learn with technologies when these can support
 - (a) knowledge construction
 - (b) explorations
 - (c) learning by doing
 - (d) learning by conversing
 - (e) learning by reflecting

(Jonassen et al., 1999: 13)



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ICT

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- Computer system is not that of a teacher/expert, but rather, that of a mind-extension cognitive Tool. (Derry and LaJoie, 1993)
- Teachers should select cognitive tools to provide formalism that is most effective for analyzing and thinking about domain knowledge rather than always relying on verbal accounts to reflect understanding.
- Cognitive tools are not computer games and it is unrealistic to expect students to be able work with them without the teacher's support and guidance.



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Student-Centered Approach to Learning

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- In this model, **teachers and students play an equally active role** in the learning process.
- The teacher's primary **role is to coach and facilitate student learning** and overall comprehension of material.
- Student **learning is measured through both formal and informal forms of assessment**, including group projects, student portfolios, and class participation.
- **Teaching and assessment are connected**; student learning is continuously measured during teacher instruction.



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How to Approach Teaching and Learning and Assessment Schemes to aligning with ELOs in Your Curriculum Design

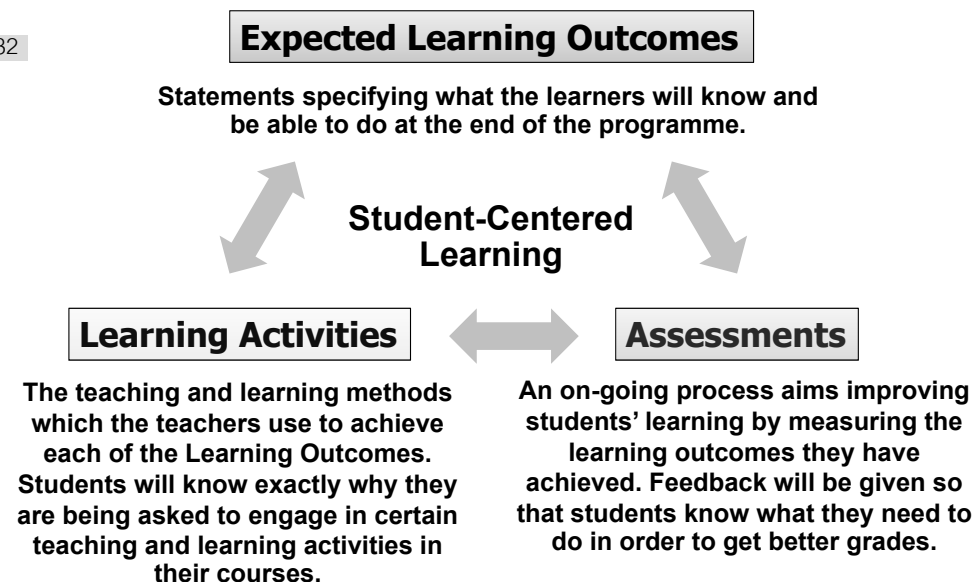


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OBE Concept

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Constructive Alignment

Approach 1: Design Performance Criteria

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1. From each ELO write down the tasks or activities that you think you students should perform to indicate the understanding or having skill stated in the ELO.
2. How can these tasks/activities be teach?
3. How will these activities/tasks be evaluated?

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Example: Student Outcomes and Corresponding Performance Criteria

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ELO 4: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

- Criterion 4.1 Uses computer simulation and modeling
- Criterion 4.2 Maintains current abilities in professional software use
- Criterion 4.3 Seeks and uses resources for problem solving

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Example: Student Outcomes and Corresponding Performance Criteria

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ELO 5: an ability to function on multidisciplinary teams

- Criterion 5.1 Displays knowledge of other disciplines
- Criterion 5.2 Shows ability to collaborate and applies conflict management skills
- Criterion 5.3 Applies decision making

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Performance Criteria

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- The Performance Criteria capture the essence of what is important, critical and central about doing well at the particular discipline or area of study/activity covered by the E/CLO. The criteria should not include aspects of performance that are not essential and intrinsic to the nature of the activity/discipline. A E/CLO will usually have between 3 and 10 performance criteria and these should be roughly of equal importance.

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- The performance criteria must be **meaningful to the particular LO or course**; they **should not be so generic** that they could apply to any LO or course.
- This **does not mean that generic skills such as communication do not appear**; it means that the criterion will be about communication **in the context of that particular performance** in the particular way in which communication occurs in that discipline, subject or area of study or activity.
- The performance criterion **starts with a verb**. This verb indicates to students **the level of cognition** that is being looked for. The rest of the criterion is respects to a learning outcome in that it typically provides content (**what students should be doing something with**) and **context**.

Examples of performance criteria

- **Develop** a personal movement vocabulary as a means of expression.
- **Use** probability and data analysis techniques to analyse distributions.
- **Reflect** on the relevance of the content to your practice
- **Interpret and analyse** data from your lab experiment
- **Apply** knowledge of the concept of osmosis to the membrane structure
- **Outline** the likelihood and impact of risks
- **Explain** how the specified use of technology is appropriate for your context, students and discipline

ELO 4: Use the techniques, skills, and modern engineering tools necessary for engineering practice.

Performance Criteria	Student Learning	Teaching Activities	Assessment Methods
4.1 Uses computer simulation and modeling	Experience in using computer simulation	Set of reading, Labs, assignment and report	Weekly homework, quizzes and rubric.
4.2 Maintains current abilities in professional software use	Using current professional software	Set of reading, Labs, assignment and report	Weekly homework, quizzes and rubric.
4.3 Seeks and uses resources for problem solving	Problem solving skill under resources provided	Assignment and report	Rubric

Exercise: Design Performance Criteria

1. From each ELO design **three tasks or activities** that you think you students should perform to indicate the understanding or having skill stated in the ELO.
2. How can these tasks/activities be teach?
3. How will these activities/tasks be evaluated?

30 minutes

Specific Expected Learning Outcomes (ELOs)

- 41
- ELO 1:**
- Performance criteria 1:**
- Performance criteria 2:**
- Performance criteria 3:**
- ELO 2:**
- Performance criteria 1:**
- Performance criteria 2:**
- Performance criteria 3:**
- ELO 3:**
- Performance criteria 1:**
- Performance criteria 2:**
- Performance criteria 3:**



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ELO 1:

.....

Performance Criteria	Student Learning	Teaching Activities	Assessment Methods



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ELO 4: Use the techniques, skills, and modern engineering tools necessary for engineering practice.

Performance Criteria	Student Learning	Teaching Activities	Assessment Methods
4.1 Uses computer simulation and modeling	Experience in using computer simulation	Set of reading, Labs, assignment and report	Weekly homework, quizzes and rubric.
4.2 Maintains current abilities in professional software use	Using current professional software	Set of reading, Labs, assignment and report	Weekly homework, quizzes and rubric.
4.3 Seeks and uses resources for problem solving	Problem solving skill under resources provided	Assignment and report	Rubric



Approach 2: Using BCD

- 44
1. Look at the BCD of each ELO, discuss and write down teaching and learning activities for each skill and knowledge that you think you students should learn to understand or having skill.
 2. How will these activities/tasks be evaluated?



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	X

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Curriculum Map: Course matrix

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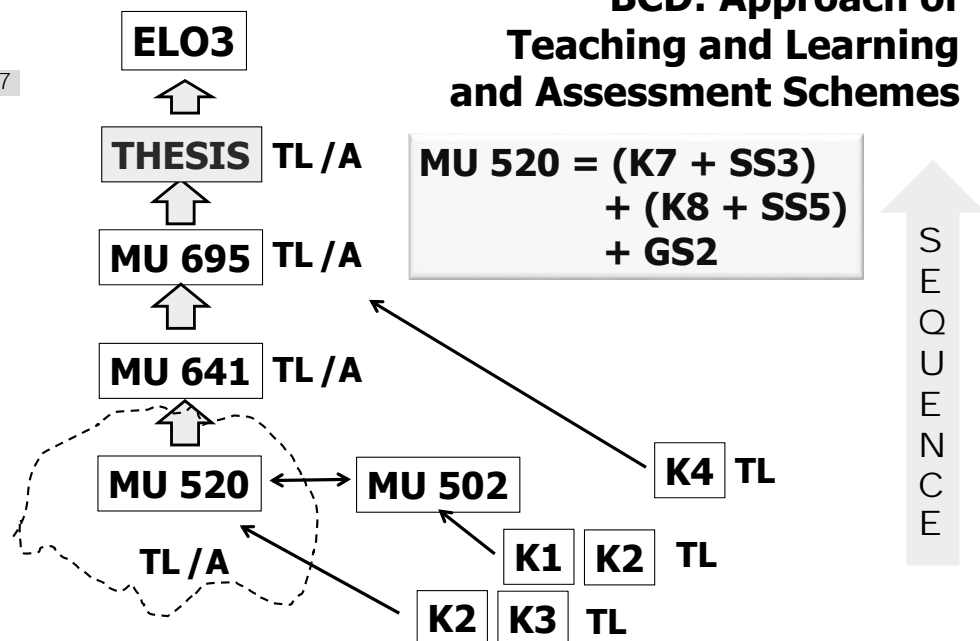
COURSES	ELO1	ELO2	ELO3	ELO4	ELO5
Core Courses					
MU 501	K5/SS1			GS1	
MU 502		K6/SS2	K6/SS4		GS2
MU 520	K7/SS3		K8/SS5		GS2
Specialize Courses					
MU 621	SS6			GS1	
MU 641		SS7	SS8		GS2
MU 695	SS9	SS10	SS11/A	GS3	GS4
THESIS		SS1-11		GS1-4	

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BCD: Approach of Teaching and Learning and Assessment Schemes

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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

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Constructive Alignment at course level

49 **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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Approach Teaching and Learning and Assessment Schemes to aligning with course learning outcomes (CLOs)

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Alignment of LO and TLA

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Typical ELO	Possible TLAs
Describe	Set reading, lecture, report on
Explain	Tutorial, activities, write essay
Integrate	Project, assignment
Apply	Project, case study
Solve problem	PBL, case study
Design, create	Project, poster
Hypothesise	Experiment, project
Reflect	Reflective diary

- The point is not how you are going to teach but how and **what you want your students to learn.**
- NOTE! Many of these **TLAs can be assessments tasks** as well. Then you have excellent alignment.

MLV20095



Alignment of LO and Assessment Tasks

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Common ELOs	Possible Assessment
Describe	Assignment, essay question exam
Explain	Assignment, essay question exam,
Integrate	Project, assignment
Analyse	Case study, assignment
Apply	Project, case study, experiment
Solve problem	Case study, project, experiment
Design, create	Project, experiment, poster
Reflect	Reflective diary, portfolio, self-assessment
Communicate	A range of oral, writing or listening

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Exercise: Design Performance Criteria for each CLO

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1. From each CLO discuss and write down the tasks or activities that you think you students should perform to indicate the understanding or having skill stated in the CLO.
2. How can these tasks/activities be teach?
3. How will these activities/tasks be evaluated?

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Specific Course Learning Outcomes (CLOs)

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- CLO 1:**
 Performance criteria 1:
 Performance criteria 2:
 Performance criteria 3:
- CLO 2:**
 Performance criteria 1:
 Performance criteria 2:
 Performance criteria 3:
- CLO 3:**
 Performance criteria 1:
 Performance criteria 2:
 Performance criteria 3:

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Course

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CLO 1: Develop the understanding on the state of stresses and strains in engineering components as a result of different loading conditions.				
Performance Criteria	Student Learning Outcome	Learning Activities	Assessment Methods	ELO
Describe state of stress and member force	List the basic principles of stress.	Lecture and discussion in class	Weekly homework and quizzes.	2
Differentiate various material behavior	Describe all kind of design principles.	Lecture and discussion in class	Weekly homework and quizzes.	2

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**To Be
Continue..**



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Student Assessment

Assessment *for* Student Learning: Developing a Scoring Rubrics

Chavalit Wongse-ek
Veeradeth Panvisavas



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What is assessment?

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The word '*assess*' comes from the Latin verb '*assidere*' meaning '**to sit with**'.

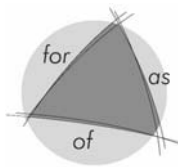
This implies it is something *we do 'with' and 'for'* students and **not 'to'** students (Green, 1999)

Assessment is the ongoing process of gathering, analysing and reflecting on evidence to make informed and consistent judgements to improve future student learning.

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Three main purposes for assessment

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Assessment *for* learning occurs when teachers use inferences about student progress to inform their teaching. (formative)

Assessment *as* learning occurs when students reflect on and monitor their progress to inform their future learning goals. (formative)

Assessment *of* learning occurs when teachers use evidence of student learning to make judgements on student achievement against goals and standards. (summative)

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Assessment OF Learning (Summative)	Assessment FOR Learning (Formative)
Happens after learning takes place	An integral part of learning process
Information is gathered by teacher	Information is shared with learner
Information is usually transferred into marks	Information is available on quality of learning
Comparison with performance of others	Is linked to learning intentions and success criteria
Looks back on past learning	Looks forward to the next stage of learning

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Formative Assessment

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Formative assessment has been described as being *assessment for learning*.

It “refers to all those activities undertaken by teachers, and by the students in assessing themselves, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged”.

(Black and Williams, 1998).

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Summative Assessment

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Summative assessment is assessment that tries to *summarise student learning* at some point in time – usually at the end of a module or programme.

Summative assessment has been described as “end-of-course assessment and essentially means that this is assessment which produces a measure which *sums up someone’s achievement* and which has no other real use except as *a description of what has been achieved*” (Brown and Knight, 1994).

Thus, the use of summative assessment enables a grade to be generated that *reflects the student’s performance*..

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Formative

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• ‘... often means no more than that the assessment is carried out frequently and is planned at the same time as teaching.’ (Black and Wiliam, 1999)

• ‘... provides feedback which leads to students recognizing the (learning) gap and closing it ... it is forward looking ...’ (Harlen, 1998)

• ‘... includes both feedback and self-monitoring.’ (Sadler, 1989)

• ‘... is used essentially to feed back into the teaching and learning process.’ (Tunstall and Gipps, 1996)

Summative

• ‘...assessment (that) has increasingly been used to sum up learning...’ (Black and Wiliam, 1999)

• ‘... looks at past achievements ... adds procedures or tests to existing work ... involves only marking and feedback grades to student ... is separated from teaching ... is carried out at intervals when achievement has to be summarized and reported.’ (Harlen, 1998)



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3 Key principles of quality assessment

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- **Validity** - appropriate for what you want to measure
- **Reliability** - yields consistent responses over time
- **Fairness**

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3 Key principles of quality assessment

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Valid assessment

- Valid assessment design engages students in tasks aligned with the unit's intended learning outcomes and measures students' achievement of those learning outcomes (Morgan et al., 2004).
- Therefore, for an assessment to be considered *valid* it requires explicit alignment between intended learning outcomes of the unit, teaching and learning activities, and the assessment methods and tasks used to measure student achievement of those outcomes.

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Reliable assessment

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- The term reliability refers to a demonstrated *consistency of marking overtime*, between multiple markers, and across a cohort of students. When marking is one consistently (reliably) by multiple assessors, this is referred to as *inter-marker reliability*. When an individual assessor marks consistently from the start of a marking process to its conclusion, this is referred to as intra-marker reliability.
- *A criteria and standards-based approach to assessment provides a foundation for reliable assessment* because it articulates the teacher's expectations of what students will achieve in the assessment task. Marking from transparent criteria and standards also enables multiple assessors to provide more consistent feedback to students on their effort.

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Fair assessment

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- A fair assessment task is one in which *students are given equitable opportunities to demonstrate their learning* (Lam, 1995).
- Fair assessment processes require that students are not inadvertently placed in a better or worse position to demonstrate their achievement.
- Fair assessment is achievable within the timeframe allocated, and with the resources available.
- *The provision of criteria and standards* makes the assessment process more transparent for students.

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Criterion referenced assessment (CRA)

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- Criterion referenced assessment (CRA) is the ***process of evaluating (and grading) the learning of students against a set of pre-specified qualities or criteria, without reference to the achievement of others*** (Brown, 1998; Harvey, 2004).
- The pre-specified **qualities or criteria are what students have to do during assessment in order to demonstrate that they have achieved the learning outcomes.**
- How well they do this is described at different levels - these are ***performance standards*** (or performance descriptors). Thus, CRA is assessment that has standards which are 'referenced' to criteria.

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What does CRA involve?

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1. **Create Rubrics** that are applied to students when the **assessment task** is assigned, and which contain:
 - a. Specific **performance criteria** for each assessment task in a unit (that enable measurement of ELOs)
 - b. Meaningful **performance standards** (descriptors) for each assessment criterion (specific to the task)
2. Active familiarisation of students with them prior to submission of the assessment task
3. Use of the rubric when assessing student work, to assign a grade and provide feedback) to students
4. Review of the performance criteria and standards descriptors after marking of each assessment task

<http://www.teaching-learning.utas.edu.au/assessment/criterion-referenced-assessment>



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Performance criteria and Performance standard

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- **Performance Criteria** define the characteristics of the work or performance, but they do not define how well students must demonstrate those characteristics - that is the job of the **Performance Standards** (descriptors).
- **Performance Criteria** provide for students the answer to the question, "**What do student have to do?**", and the **Performance Standards** (descriptors) provide the answer to the question, "**How do student do that?**".



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Step of designing student assessment

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1. From a **learning outcome**
2. Design **assessment task** or work or activities to measure for the particular outcome
3. Design the **performance criteria** or assessment criteria (student performance and/or behavior) that indicate the achievement
4. Design the **performance standard** (pass) for each performance criterion



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ELO4: Perform imaging of CT-brain in emergency

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



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ELO 4: Perform imaging of CT-brain in emergency

Performance Criteria	Assessment task	Performance standard	Assessment Methods
4.1 perform patient approach	1. Activity during CT examination in CT-room 2. Share and learn session	Describe clearly the procedure to the patient. The patient can understand well all that procedure.	1. Measure actual performance of student during practice. 2. Peer assessment during share and learn session

Approach Teaching and Learning and Assessment Schemes to aligning with course learning outcomes (CLOs)

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Exercise: Design Performance Criteria for each CLO

1. From each CLO discuss and write down the tasks or activities that you think you students should perform to indicate the understanding or having skill stated in the CLO.
2. How can these tasks/activities be teach?
3. How will these activities/tasks be evaluated?

Specific Course Learning Outcomes (CLOs)

- CLO 1:**
- Performance criteria 1:
- Performance criteria 2:
- Performance criteria 3:
- CLO 2:**
- Performance criteria 1:
- Performance criteria 2:
- Performance criteria 3:
- CLO 3:**
- Performance criteria 1:
- Performance criteria 2:
- Performance criteria 3:

Course

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CLO 1: Develop the understanding on the state of stresses and strains in engineering components as a result of different loading conditions.

Performance Criteria	Student Learning Outcome	Learning Activities	Assessment Methods	ELO
Describe state of stress and member force	List the basic principles of stress.	Lecture and discussion in class	Weekly homework and quizzes.	2
Differentiate various material behavior	Describe all kind of design principles.	Lecture and discussion in class	Weekly homework and quizzes.	2

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Creating and Using Scoring Rubrics

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What is a RUBRICS?

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A rubric is *an assessment tool* often shaped like a matrix, which *describes levels of achievement* in a specific area of performance, understanding, or behavior.

Rubrics are criterion-referenced, rather than norm-referenced.

<http://manoa.hawaii.edu/assessment/howto/rubrics.htm#p5>

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Types of rubrics

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There are two kinds of rubrics in common usage – **analytic rubrics and holistic rubrics**

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Holistic rubrics

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- Single criteria rubrics used to assess a **students' overall achievement** on a particular learning outcome (ELO, CLO), an activity or item based on predefined achievement levels
- Performance standards (descriptions) are written in paragraphs and usually in full sentences.



Research Paper (Holistic Rubric)

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Score	Criteria
4 (80-100%)	Research paper demonstrates complete understanding and execution of the assigned objectives. Thesis statement/argument is clearly stated, complex and original, and the writing does not spend excessive time on any one point of development at the expense of developing other points in the body of the paper. Writing is also error-free, without ambiguity, and reads smoothly, creatively, and with a purpose.
3 (70-79%)	Research paper demonstrates considerable understanding and execution of the assigned objectives. Thesis statement/argument is stated, verges on the complex and original, and the writing shows accuracy and balance in developing body points, but may exhibit occasional weaknesses and lapses in correctness. Writing also has some errors and ambiguities, yet does read clearly and coherently.
2 (60-69%)	Research paper demonstrates some understanding and execution of the assigned objectives. Thesis statement/argument is faintly stated and/or expected and not confident, and the writing is inconsistent in terms of balance in developing body points, and exhibits weaknesses and lapses in correctness. Writing also has many errors and ambiguities, and may read confusingly and incoherently.
1 (50-59%)	Research paper demonstrates limited understanding and execution of the assigned objectives. Thesis statement/argument is simplistic, unoriginal, and/or not present at all, and the writing is unbalanced in developing body points, weak, and incomplete. Writing also has numerous errors and ambiguities, and reads confusingly and incoherently.

*Adapted from John Bean, Engaging Ideas, Exhibit 15.4:
Holistic Scale for Grading Article Summaries*



Note: Holistic rubrics

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- Holistic rubrics are **useful when the sum of the student's performance in a task is more important** than their performance in component parts.
- Holistic rubrics may be more **suited to assessing complex higher order thinking tasks** and to tasks where it is **not easy to separate the performance** of one criterion from another.
- Depending on their detail, **holistic rubrics may give only general or limited guidance to students about how to perform different characteristics of the task.** Detailed holistic rubrics with multiple criteria may be more difficult for markers to apply.



Analytic Rubrics

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- **Two-dimensional rubrics with levels of students' achievement as columns and assessment criteria (performance criteria) as rows.**
 - Allows you to assess students' achievements based on multiple criteria using a single rubric.
 - You can assign different weights (value) to different criteria and include an overall achievement by totaling the criteria;
- Written in a table form.



Research Paper (Analytic Rubric)

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Criteria	Level of mastery / Scale			
	Adequate (50-59%)	Competent (60-69%)	Good (70-79%)	Excellent (80-100%)
Knowledge of forms, conventions, terminology, and strategies relative to the importance of sources to subject	Demonstrates limited knowledge of forms, conventions, terminology, and strategies relative to importance of sources to subject	Demonstrates some knowledge of forms, conventions, terminology, and strategies relative to importance of sources to subject	Demonstrates considerable knowledge of forms, conventions, terminology, and strategies relative to importance of sources to subject	Demonstrates thorough and insightful knowledge of forms, conventions, terminology, and strategies relative to importance of sources to subject
Critical and creative thinking skills	Uses critical and creative thinking skills with limited effectiveness	Uses critical and creative thinking skills with moderate effectiveness	Uses critical and creative thinking skills with considerable effectiveness	Uses critical and creative thinking skills with a high degree of effectiveness
Communication of information and idea	Communicates information and idea with limited clarity	Communicates information and ideas with some clarity	Communicates information and ideas with considerable clarity	Communicates information and ideas with a high degree of clarity and with confidence
Quality of argument and writing	Argument is simple and unoriginal, and the writing is weak and inconsistent	Argument takes on a fair and expected position, and the writing is moderately clear and coherent	Argument bridges on the complex and original, and the writing is clear and coherent	Argument is complex and original, and the writing is strong, fluid, and creatively coherent
Spelling and grammar	Several errors in spelling and grammar	A few errors in spelling and grammar	Some errors in spelling and grammar	No errors in spelling and grammar

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Noted: Analytic rubrics

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- Analytic rubrics describe **separate levels of performance for each criterion**.
- Analytic rubrics have the potential to provide more detailed feedback to students on how well they are doing in the various components of the task: this is particularly **useful in formative assessment contexts** where students are able to incorporate their learning from feedback into a subsequent task.
- Analytic rubrics may be easier for assessors to apply. They evaluate student performance more precisely, but **may obscure its totality** (Morgan et al., 2004; Biggs, 2003).

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- Analytic rubrics are more likely to be used **when the assessment task has a large number of criteria** and where **criteria are separately weighted** (Mueller, 2006).
- It's worth noting however, that analytic rubrics with **many criteria can be challenging for students to address** since the task is broken up into many differentiated components.

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What are the parts of a analytic rubrics?

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Analytic rubrics are composed of **four** basic parts including:

- A task description.** The outcome being assessed.
- The performance criteria** to be rated (each row). The criteria described as skills, knowledge, and/or behavior to be demonstrated.
- Levels of mastery/scale** (columns).
- A performance standard** (description of achievement) at each level of mastery/scale (cells).

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What are the parts of a analytic rubric? 1/4

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1. A task description. The outcome being assessed or instructions students received for an assignment.

<https://www.cte.cornell.edu/documents/Scienc>

Research Paper Rubric Name: _____ Date: _____ Score: _____

Category	Exceeds Standard	Meets Standard	Nearly Meets Standard	Does Not Meet Standard
Title Page	Title Your Name, Teacher's Name, Course Period, Date. Neatly finished-no errors	Evidence of four	Evidence of 3	Evidence of 2 or less
Thesis Statement	Clearly and concisely states the paper's purpose in a single sentence, which is engaging, and thought provoking.	Clearly states the paper's purpose in a single sentence.	States the paper's purpose in a single sentence.	Incomplete and/or unfocused.
Introduction	The introduction is engaging, states the main topic and previews the structure of the paper.	The introduction states the main topic and previews the structure of the paper.	The introduction states the main topic but does not adequately preview the structure of the paper.	There is no clear introduction or main topic and the structure of the paper is missing.

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What are the parts of a analytic rubric? 2/4

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2. The performance criteria to be rated (each row). The criteria described as skills, knowledge, and/or behavior to be demonstrated.

<https://www.cte.cornell.edu/documents/Scienc>

Research Paper Rubric Name: _____ Date: _____ Score: _____

Category	Exceeds Standard	Meets Standard	Nearly Meets Standard	Does Not Meet Standard
Title Page	Title Your Name, Teacher's Name, Course Period, Date. Neatly finished-no errors	Evidence of four	Evidence of 3	Evidence of 2 or less
Thesis Statement	Clearly and concisely states the paper's purpose in a single sentence, which is engaging, and thought provoking.	Clearly states the paper's purpose in a single sentence.	States the paper's purpose in a single sentence.	Incomplete and/or unfocused.
Introduction	The introduction is engaging, states the main topic and previews the structure of the paper.	The introduction states the main topic and previews the structure of the paper.	The introduction states the main topic but does not adequately preview the structure of the paper.	There is no clear introduction or main topic and the structure of the paper is missing.

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What are the parts of a analytic rubric? 3/4

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3. Levels of mastery/scale (columns). Labels used to describe the levels of mastery should be tactful and clear. Commonly used labels are:

- Not meeting, approaching, meeting, exceeding
- Exemplary, proficient, marginal, unacceptable
- Advanced, intermediate high, intermediate, novice
- 1, 2, 3, 4

<https://www.cte.cornell.edu/documents/Science%20Rubrics.pdf>

Research Paper Rubric Name: _____ Date: _____ Score: _____

Category	Exceeds Standard	Meets Standard	Nearly Meets Standard	Does Not Meet Standard	No Evidence	Score
Title Page	Title Your Name, Teacher's Name, Course Period, Date. Neatly finished-no errors	Evidence of four	Evidence of 3	Evidence of 2 or less	Absent	

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What are the parts of a analytic rubric? 4/4

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4. A performance standard (description of achievement) at each level of mastery/scale (cells).

<https://www.cte.cornell.edu/documents/Science%20Rubrics.pdf>

Research Paper Rubric Name: _____ Date: _____ Score: _____

Category	Exceeds Standard	Meets Standard	Nearly Meets Standard	Does Not Meet Standard	No Evidence	Score
Title Page	Title Your Name, Teacher's Name, Course Period, Date. Neatly finished-no errors	Evidence of four	Evidence of 3	Evidence of 2 or less	Absent	
Thesis Statement	Clearly and concisely states the paper's purpose in a single sentence, which is engaging, and thought provoking.	Clearly states the paper's purpose in a single sentence.	States the paper's purpose in a single sentence.	Incomplete and/or unfocused.	Absent, no evidence	
Introduction	The introduction is engaging, states the main topic and previews the structure of the paper.	The introduction states the main topic and previews the structure of the paper.	The introduction states the main topic but does not adequately preview the structure of the paper.	There is no clear introduction or main topic and the structure of the paper is missing.	Absent, no evidence	
Body	Each paragraph has thoughtful supporting detail sentences that develop the main idea.	Each paragraph has sufficient supporting detail sentences that develop the main idea.	Each paragraph lacks supporting detail sentences.	Each paragraph fails to develop the main idea.	Not applicable	
Organization-Structural	Writer demonstrates logical and subtle sequencing of ideas through well-developed	Paragraph development present but not perfected.	Logical organization; organization of ideas not fully developed.	No evidence of structure or organization.	Not applicable	

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The descriptors (performance standards)

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The process of writing descriptors as following:

- Begin with the Pass standard (PS) – The main substance of the criteria is being addressed but has not gone beyond it.
- Next the High Distinction (HD) standard - Meaning the student has fully addressed the criteria plus done something beyond that or something you might not have expected.
- Next the Fail standard (FL) – This would be what you might indicate to students prior to their submission about what not to do.
- Then go to the Credit (CR) and the Distinction (DN) standards –these are usually the *hardest to write*, because you are referencing the standard on either side all the time.

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Some guidelines:

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1. Write standards as simply as possible avoiding unnecessary words that detract from clarity. *Rather than say: demonstrate the ability to identify relevant sources just say: identify relevant sources.*
2. Avoiding unnecessarily complex structures and ones that include several aspects of performance. *E.g. Consider, select and use strategies to anticipate and solve minor problems.*
3. Always try to describe the actual performance you expect to see. E.g. use relevant sources of information in the report, produce designs incorporating all key features, list the basic steps in the process.

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Some guidelines:

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4. Avoid phrases that don't describe any particular performance. *E.g.:*
 - *Demonstrate a sound knowledge of.,*
 - *Demonstrate comprehensive understanding of a wide range of...,*
 - *Demonstrate some willingness to attempt...,*
 - *Attempt to...*
5. Avoid very subjective terms such as 'satisfactory', 'good', 'acceptable', 'adequate', 'very well'. These mean different things to different people. *Describe the actual performance you expect to see from the student.*

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Some guidelines:

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6. Try to make the distinction between the ratings as clear as possible. You do not need to use the same form of words. For example:

'C' rating	'B' rating	'A' rating
Lists the basic components	Describes the function of the major systems	Identify common system malfunctions

7. The distinction between the ratings can sometimes be best described by using different verbs. For example:

'C' rating	'B' rating	'A' rating
use	modify	design
copy	draft	design
respond	guide	facilitate

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Grading Rubrics: Sample Scales

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Three Levels

Weak	Satisfactory	Strong
Beginning	Intermediate	High
Weak	Average	Excellent
Developing	Competent	Exemplary
Low Mastery	Average Mastery	High Mastery

Four Levels

Unacceptable	Marginal	Proficient	Distinguished
Beginning	Developing	Accomplished	Exemplary
Needs Improvement	Satisfactory	Good	Accomplished
Emerging	Progressing	Partial Mastery	Mastery
Not Yet Competent	Partly Competent	Competent	Sophisticated
Inadequate	Needs Improvement	Meets Expectations	Exceeds Expectations
Poor	Fair	Good	Excellent

Five Levels

Poor	Minimal	Sufficient	Above Average	Excellent
Novice	Intermediate	Proficient	Distinguished	Master
Unacceptable	Poor	Satisfactory	Good	Excellent

Six Levels

Unacceptable	Emerging	Minimally Acceptable	Acceptable	Accomplished	Exemplary
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Scoring

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PRESENTATION

	LEVEL 4	LEVEL 3	LEVEL 2	LEVEL 1
	Exceptional	Effective	Acceptable	Developing
Knowledge / Understanding				
Demonstrates an understanding of the topic	thorough understanding	considerable understanding	moderate understanding	emerging understanding
Inquiry / Thinking				
Develops and supports an original idea or opinion about the topic	thorough development and support	considerable development and support	moderate development and support	emerging sense of development and support
Communication				
Addresses audience and speaks clearly with fluency, structure, and purpose	high degree of fluency, structure, and purpose	considerable fluency, structure, and purpose	moderate fluency, structure, and purpose	emerging fluency and sense of structure and purpose
Application				
Exercises rhetorical skills such as emphasis, timing, pacing, reasoning, and questioning	high degree of skill	considerable skill	moderate skill	emerging skill

$$\text{Overall Grade: } \frac{9}{16} = 56\%$$

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Exercise: Design Performance Criteria

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1. From each ELO design **three tasks or activities** that you think you students should perform to indicate the understanding or having skill stated in the ELO.
2. How can these tasks/activities be teach?
3. How will these activities/tasks be evaluated?

30 minutes

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100

ELO 4: Perform imaging of CT-brain in emergency

Performance Criteria	Assessment task	Performance standard	Assessment Methods
4.1 perform patient approach	1. Activity during CT examination in CT-room 2. Share and learn session	Describe clearly the procedure to the patient. The patient can understand well all that procedure.	1. Measure actual performance of student during practice. 2. Peer assessment during share and learn session

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Exercise : Develop a holistic/analytic rubric

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From your ELOs, design a holistic or analytic rubric to measure student performance of a particular learning outcome.

Learning outcome



Performance criteria
(Assessment criteria)



Performance standards
(Rubrics)



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Thank You

... for joining us.



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