



20 TIPS FOR DESIGNING EFFECTIVE ASSESSMENT FOR ENGINEERS

- 1. Clear Alignment between the Learning Outcomes, the Learning Activities and the Assessment:** For each assessment, there should be a clear alignment between the assessment, the learning activities and the learning outcomes of the curriculum. Teacher should ensure that the assessment methods employed allow the students to demonstrate the learning outcomes appropriately. For example, to assess engineering design, exams may not be the most appropriate assessment method to establish student's ability. Do bear in mind what you are trying to test, and they should be aligned with the intended learning outcomes.
- 2. Appropriate Use of Group Assessment:** Do not overuse group assessment, it is inappropriate to assess students' knowledge in a group when the assessment can be done more or as efficiently by the individual. For example, do not use essays to measure knowledge or understanding that can be assessed using less time-consuming assessment methods.
- 3. Grading Moderation:** Assessment criteria and marking scheme should be explicitly shown and explained to students and shared with other teachers teaching in the course to ensure transparency and reliability, and that the grades are awarded appropriately and consistently. Prepare a structured marking sheet (rubrics) for all assessors and students so as to increase marking reliability, provide opportunities for students to practice using these marking schemes, provide exemplars where possible. For engineering and mathematical types of questions, let the students know if they will receive marks for showing partial work (process based) or only the results (product based), also, indicate the importance of the units, grammar or other technical abilities. Let the students know what your marking style is like: is bullet point format acceptable, or does it have to be an essay format?
- 4. Workload:** Student and staff workload should be taken into consideration when designing the assessment.
- 5. Class Size:** Class size must also be taken into account to allow assessment being conducted in an effective manner.
- 6. Purposes of the Assessment:** Both teachers and students should have a clear idea on what the objectives of the assessment are. For example, if it is for pre-diagnosed or guiding student approaches through feedback.
- 7. Discourage rote learning:** Careful and well-designed assessment will discourage rote learning.
- 8. Bias:** Teachers should ensure that there is no bias or disadvantage in an assessment towards any particular group of students.
- 9. External and Internal Policy and Guidelines:** Teachers should be aware of any accreditation body, university, faculty, departmental or programme standards and guidelines that may affect the planning of assessment or a student's overall assessment outcomes.
- 10. Time for Assessment:** Give sufficient time for students to conduct the assessment.
- 11. Prompt Feedback:** Feedback is very important and should be incorporated into the design of the assessment. Feedback should be provided in a short, precise and promptly manner.
- 12. Diverse Learning Styles:** A variety of assessment methods offers students the opportunity to learn different learning styles and to demonstrate a variety of skills.
- 13. Authentic Assessment:** Engineering students appreciate and become more motivated when assessments involve authentic, creative and "out of the box" elements that are related to real engineering issues.
- 14. Level of Difficulty:** Depending on the levels of difficulty in the subject, the assessment should cover some or all of Bloom's Taxonomy.
- 15. Formative and Summative Assessment:** An engineering curriculum should have both formative and summative assessments. Formative assessments will provide opportunities for both teachers and students to enhance teachers' teaching and students' learning during the course. Teachers can take this opportunity to find out students' understanding and may arrange additional tutorials for students if required.
- 16. Clear Assessment:** Use clear and direct language and avoid complex wordings which may confuse and frustrate students. Set the questions explicitly and precisely which are appropriate to the student cohort. Try to reduce ambiguity in the written assessment, clearly define the expected outcomes such as compare, evaluate, summarize, critique, and etc. Try not to use negatives in the assessment questions unless you are trying to catch your student out. If negatives are used, highlight, embolden or italicize them.
- 17. Practice Run:** Unfamiliar assessment methods should be introduced in-class to provide the students with some practices.

18. **Assessment Information:** Provide students the time period, place, assessment guidelines, requirements, assessment criteria and other items that are important for the assessment.
19. **Teacher/Peer/Self-Assessment:** The students should also be aware of who is going to assess them – tutor, peers and/or self. If peer and self-assessment are used, weightings and components that are to be assessed need to be specified. For example, would the weightings be the same for peer, self and teacher? Engineering students are not used to self- and peer assessment, and they may not

like it as they feel that it is not fair for them to judge each other's work nor do they have the ability to judge. It may be wise to explain to your students why self- and peer assessment is employed since engineering students tend to seek understanding of the rationale behind learning something and being assessed for it.

20. **Unexpected Answers:** Be prepared to accept other equally creative and acceptable answers, although you may not have predicted some of which as a teacher.

USEFUL WEBSITES WITH ASSESSMENT RESOURCES

Name of Institution/ Website	Title	Website Link
Assessment Commons		http://www.assessmentcommons.org/
The University of Hong Kong (Centre for the Enhancement of Teaching and Learning)	Assessment Resources@HKU	http://ar.cetl.hku.hk/
Association of American Colleges & Universities	Resources on Assessment	http://www.aacu.org/resources/assessment
Australian Universities Teaching Committee	Assessing Learning in Australian Universities	http://www.cshe.unimelb.edu.au/assessinglearning/
Cambridge Assessment		http://www.cambridgeassessment.org.uk/
Carnegie Mellon University	Conduct Assessments of Teaching & Learning	http://www.cmu.edu/teaching/designteach/teach/assesslearningteaching.html
Duke University (Center for Instructional Technology)	Assessment	http://cit.duke.edu/get-ideas/assessment/
The Higher Education Academy	Assessment & Feedback	https://www.heacademy.ac.uk/workstreams-research/themes/assessment-and-feedback
The University of Edinburgh	Enhancing feedback	http://www.enhancingfeedback.ed.ac.uk/
The University of Queensland	Assessment Guidelines	http://www.uq.edu.au/teaching-learning/assessment-guidelines
The University of Sheffield	Toolkit for Learning & Teaching - Feedback & Assessment	https://www.sheffield.ac.uk/lets/toolkit/f-a/1.209066#InPractice
University College Dublin	UCD Teaching and Learning - Assessment	http://www.ucd.ie/teaching/resources/assessment/
University of Tasmania	Teaching & Learning - Assessment	http://www.teaching-learning.utas.edu.au/assessment
University of Technology, Sydney	Assessment Futures	http://www.uts.edu.au/research-and-teaching/teaching-and-learning/assessment-futures/overview