



Bioengineering Portfolio Design and Professional Practice

Faculty: Engineering

Department: Bioengineering

Module name: Design and Professional Practice 1

Degree: Biomedical Engineering, Molecular Bioengineering

Level: Yr 1

Approximate number of students: 180

Weighting and credit: Portfolio accounts for 40% of the module

Module ECTS: 5

Assessment overview

The Portfolio assessment is designed to help students in Biomedical Engineering and Molecular Bioengineering develop key professional practice and design skills, which will be critical to their personal development throughout their degrees

The assessment is formed of frequent assignments (one per week/per fortnight), with no set deadlines through the term. Part of the professional practice skill set is that students learn to work asynchronously and manage their own time. The Portfolio is primarily assessed individually, except for one group task on engineering ethics.

Design decisions

Assignment design

The portfolio collates a series of tasks that students perform throughout the duration of the module. These tasks involve:

- Reflection assignment: a short, written report where students reflect on the process of report writing and the feedback from their peers and their tutor.
- Quizzes: online multiple-choice questions that relate to a series of videos;
- Tear Down: taking apart an object to interrogate its design features and reflect on the design choices and manufacturing process
- Sketching: A short sketching exercise to help students practice their sketching skills and to encourage using images as an efficient way to present technical information.
- Presentation: a 5-minute verbal presentation on an area of Bioengineering that students are interested in;
- Technical Drawing
- Engineering Ethics: students work in tutor groups to create a report answering one of four ethical questions relevant to Bioengineering.

Marking criteria for all of those tasks can be found in the [downloads section](#).

Rationale for the design

The Portfolio approach is an authentic way of assessing the design process, rather than using a series of quizzes or exams. This approach encourages students to ask questions, to research materials and to be critical. The Portfolio approach also encourages students to develop their reflection skills, which is very different to how students are taught in a school environment. This module gives students room to reflect on their progress, and to receive feedback on the quality of that reflection.

Rationale for the delivery method

There are no structured in-person lectures associated with this module; students can access the lessons and assignments through Mobius on Blackboard. Some elements of the assignments are completed in-person,



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e.g. presentations to tutors, whilst others are completed online, e.g. quizzes that feed into the Tear Down. Two short workshops on engineering ethics and the Tear down assignment (one in each term) allow students time to explore these areas through group work before completing the assignment in their portfolio. The reason for this delivery method is that it allows for asynchronous learning.

Rationale for the software used

Mobius (a platform within Blackboard that is usually used for numerical modules) works well for the Portfolio. The platform is built as teaching software and therefore has useful features, e.g. there is a grade book, so you can perform simple progress analyses by looking at how students have performed across one assignment, or how an individual student has performed across multiple assignments.

Fit with other assessments and the programme/module

Five out of six Learning Outcomes for the module are covered by the Portfolio. The remaining learning outcome is assessed through the design challenge which takes place in the summer term. This challenge asks the students to work in a group to develop a solution to a relatively simple problem.

This assessment teaches students how to recognise different types of feedback, and how to act on it, which is useful for all other modules. Professional practice module is continued in Year 2 where further reflection and team working skills are developed. See this case study - [Integrating peer and self-assessment into module group work assessment design](#).

Practicalities

Preparing students for assessment

after each of the topics commences. While the portfolio collates a range of tasks that students are involved in, the one that can be particularly new to the students is reflection. One of the first assignments in the Portfolio is a reflection exercise, where students write about a “Joining Us” activity that they undertook in their first week at Imperial. For this first piece of formative assessment the students are not given lots of guidance on what “reflection” entails. They are asked to think about the activity they did and then answer simple questions

about it: How did you do it? Why did you do it that way? What feedback did you get from your tutor? Is there anything you would change?

Marking arrangements

There are five parts to the portfolio, which are summatively marked by GTAs each according to separate criteria. The GTAs mark using a marking rubric, matching each part of the portfolio to the appropriate learning outcome in the rubric (please see the overall portfolio marking criteria [here](#)):

- Use appropriate engineering tools and software's to develop and communicate design concepts
- Discuss and evaluate the suitability of different materials and manufacturing methods to realise a proposed design
- Communicate technical ideas clearly both in writing and orally
- Discuss the importance of ethics in engineering and give examples of how this impacts professional practice
- Use feedback and reflective practice to improve your learning and future performance

When marking this portfolio, the assessors are looking for evidence of completing the learning activities and building the intended skills, not on producing a perfect write up of every task, nor of producing perfect products.

Feedback arrangements

This module teaches students that there are different types of feedback, and how to recognise and act on that feedback. Frequent formative feedback helps students to develop their work throughout the year, while summative feedback at the end of the module gives them an indication of their progress.

Online adaptations

The module was first delivered in its current format in 2020 and the bulk of the delivery was initially planned for the summer term, using mostly in-person sessions. The Portfolio evolved from the need to adapt this module for remote teaching, e.g. asynchronous, spread through the year, with a few in-person sessions to complement delivery.