MINEAH Mining Engineering

Introduction

Development of Stream Learning Outcomes

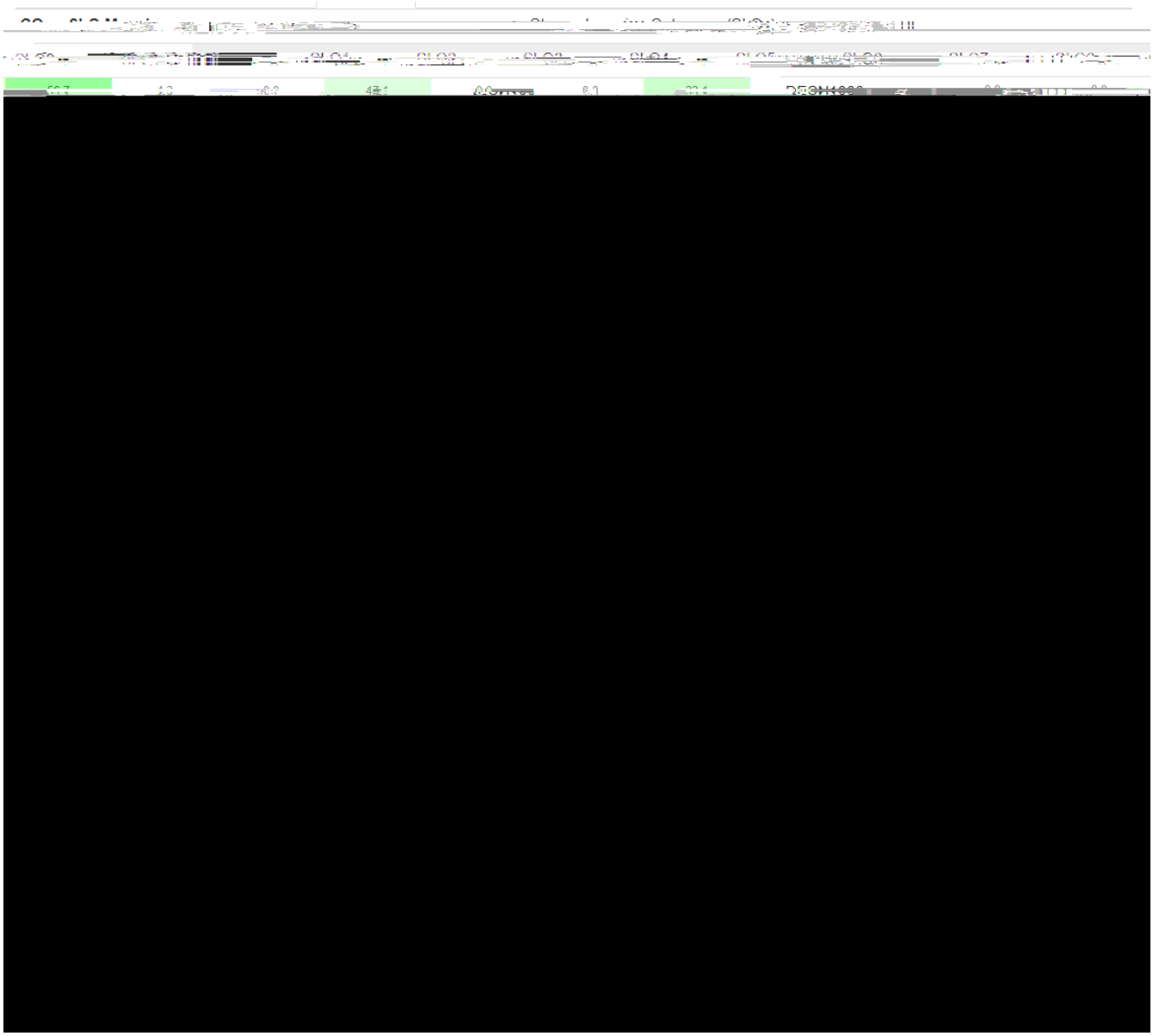
The initial significant work done to develop the Stream Learning Outcomes (SLOs) is rooted in the DYD (define your discipline) project conducted by the Mining Education Australia (MEA) in 2015. MEA was a consortium of UNSW, UQ, University of Adelaide and Curtin University to design, develop and provide common 3rd and 4th year curriculum to mining engineering graduates. The DYD process has laid the Graduate Capability Framework for the Mining Engineering Degree Programme based on comprehensive consultation with mining academics of the 4 partnered universities, students, and industry. In 2020, a task group was set by the Head of the School (HOS) to refine the MEA graduate attributes to develop MINEAH SLOs. The task force consisted of two senior professors, HOS and the undergraduate director of teaching. The developed SLOs were circulated with all mining academics in the School and discussed with students in a focused consultation. SLOs were then

Curriculum Mapping

Students can select two electives in first year and one elective each in 3rd and 4th year besides two General Education courses. Following curriculum mapping excludes General Education and two elective courses.

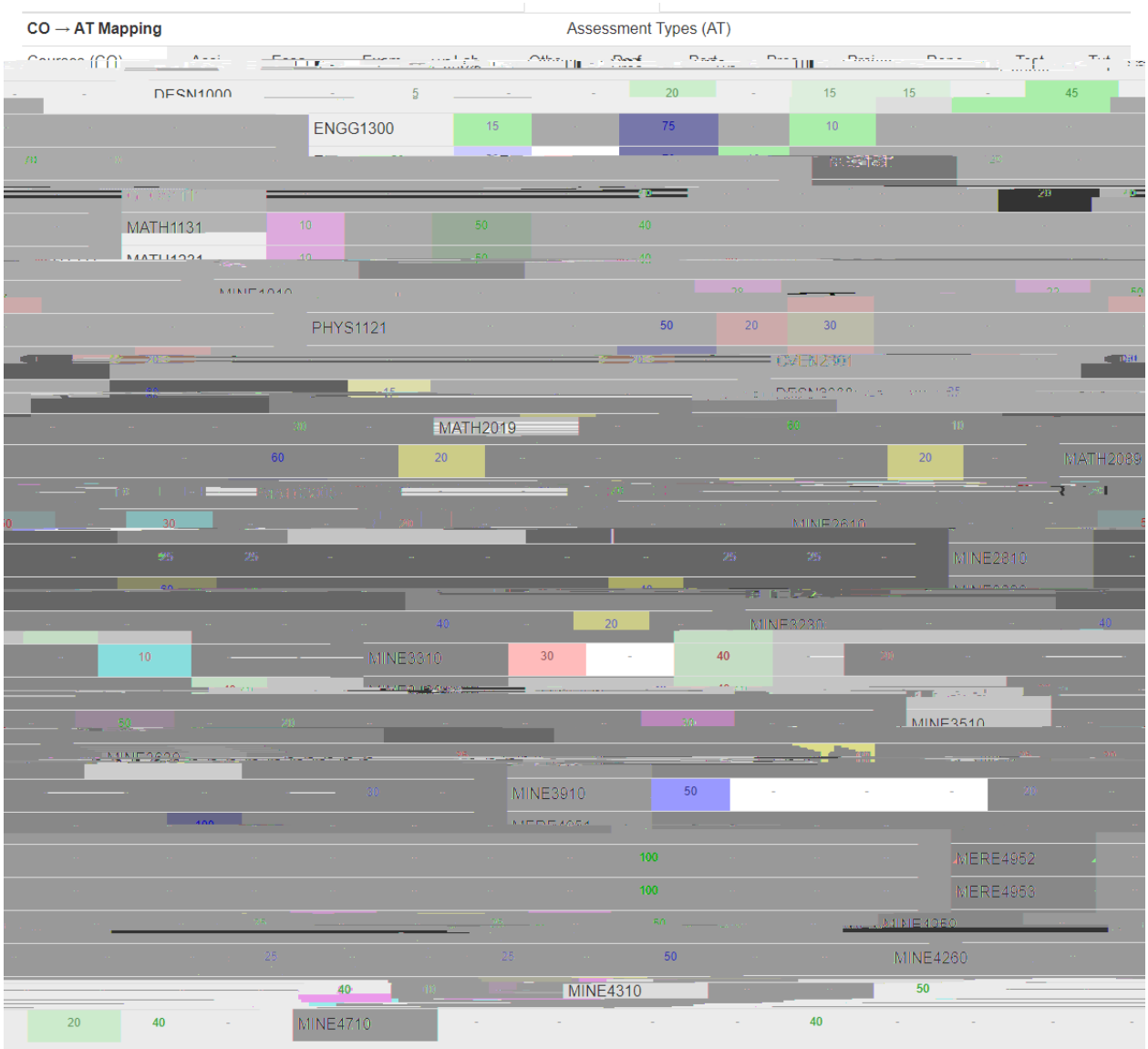
For the first-year electives students are recommended to enrol in MINE1010 and GEOS1111 or MATS1101. The most popular elective choices are GEOS1111 and MINE1010 and so these have been included in the mapping.

Table 1. Mapping from courses to Stream Learning Outcomes



The courses CLO mapping reflects relatively higher emphasis on SLO 5, SLO3 and SLO4. This justifies the applied and skill-oriented nature of the Mining Engineering stream.

Table 3. Mapping from courses to Assessment Types



The School has implemented many processes to ensure that academic integrity is maintained:

- All exam papers are reviewed by another academic. The reviewer will also be given the rubric and worked solution. When a paper is written by a new academic it will be reviewed by a professor or A/Prof to ensure standards are being maintained. Admin staff follow up to ensure all papers have been reviewed.
- Reports are submitted using TurnItIn, which ensures that students are not plagiarising or colluding.
- Academics provide rubrics and worked solutions to markers. In this case the academic will re-mark a sample of the reports or exam papers to ensure the rubric is being used correctly.
- Important works, such as thesis, will have two markers to ensure consistency.

Due to COVID all exams have moved online, so standard practices have been adopted including:

- Exams take place at a set time, so that students need to focus on their own exams.
- Questions are Googled before and after the exam. Before ensures the questions are not easy to answer with simple searches. After ensures that the papers have not been uploaded during the exam.
- Wherever practical, more than one set of question papers are prepared to include variability and avoid possible unfair means to attend the online exam.

Summary

A curriculum mapping exercise has been carried out for the MINEAH Mining Engineering stream of the 3707 Bachelor of Engineering (Honours) program at UNSW. The stream provides good coverage of all the Engineers Australia Stage 1 Graduate Competencies. It is particularly strong in specialist engineering knowledge, the use of design, analysis and computation tools, and design of innovative engineering solutions and systems. Future direction for the stream involves working on embedding ethics and sustainability more widely throughout the stream instead of focusing it in a limited number of courses. The stream has rigorous and varied assessment tasks, which have been updated and adapted to deal with the advent of COVID-19.

the elemental design of hydrocarbon production. The stream covers four major engineering practices in petroleum discipline including exploration, drilling, reservoir and production engineering. The stream is designed to produce AQF level-8 graduates who will have advanced cognitive, technical and communication skills to select and apply methods and technologies to analyse, generate and transmit solutions to complex petroleum engineering problems

Mineral & Mining Engineering is the highest-ranking UNSW subject and

PTRL2010	Business Practices in the Petroleum Industry
DESN2000	Engineering Design and Professional Practice
Year 3	
Term 1	
PTRL3025	Petroleum Economics
PTRL3015	Well Drilling Equipment and Operations
General Education	General Education
Term 2	
PTRL2030	Field Development Geology
PTRL3030	Reservoir Characterisation
Elective	Elective Course - 1
Term 3	
PTRL3050	Well Pressure Testing
PTRL3040	Numerical Reservoir Simulation

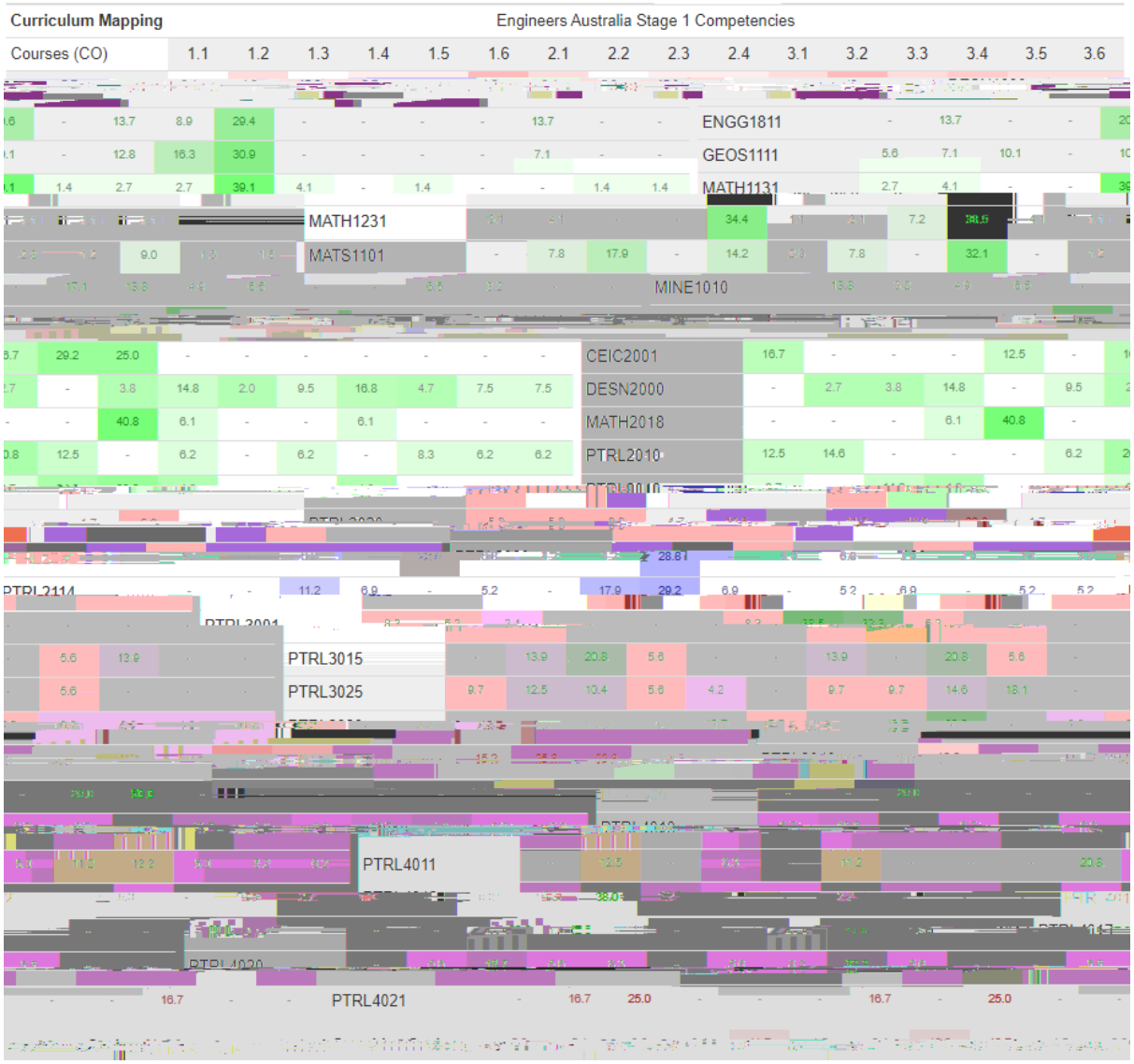
4. Able to integrate knowledge of mathematics and basic sciences including geosciences to the solution of problems related to the sustainable extraction of energy or storage of fluids including carbon dioxide in subsurface reservoirs.

5. Conceptual understanding of the design of data collection and acquisition programs for the purpose of controlling possible environmental impacts, monitoring engineering operations and optimizing reservoir performance.

6. Able to evaluate, adapt, employ, and manage rapidly emerging technologies in the oil & gas industry.

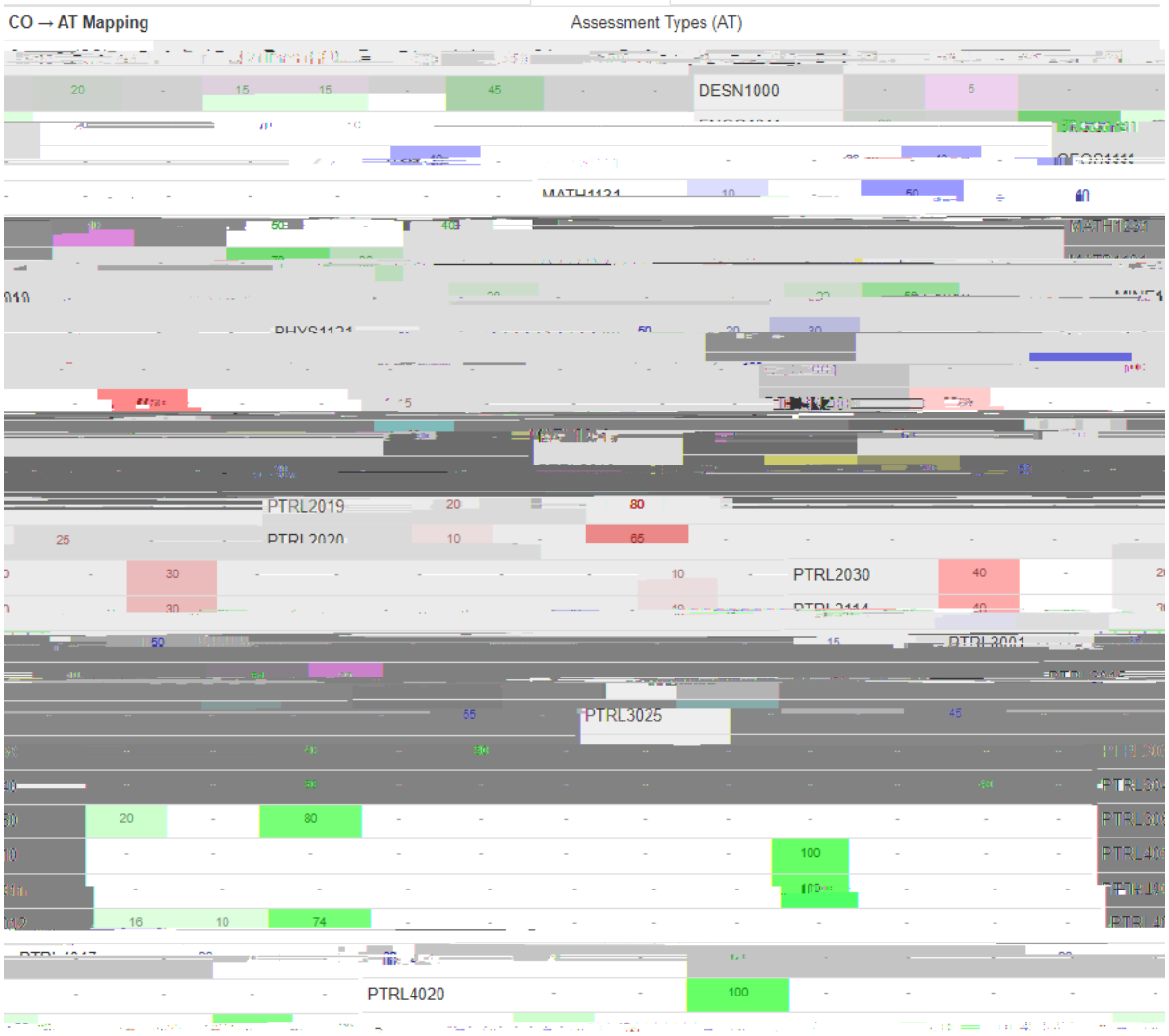
Application of Knowledge and Skills

Table 2. Mapping from courses to EA Stage 1 Graduate Capabilities



Mapping of assessments against courses is presented in Table 3.

Table 3. Mapping courses assessments



Reflection on Strengths Weaknesses and Future Action

Strengths

The stream offers a comprehensive suite of courses required for raising the next generation of competent petroleum engineers. In particular, a strong fundamental and practical specialist engineering knowledge is transferred to the students in their course of study in the stream. The mapping shows a particular focus on application in the stream. For instance, 2.3 Application of systematic engineering synthesis and design processes - is the highest. The stream covers important parts of industry standard practices such as design, computation, report writing, research, and innovative engineering practices making the students ready to take everyday responsibilities in the industry positions.

Weaknesses

The review of CLOs and SLOs show that the stream has weaknesses in professional engineering practices in particular ethics, health and safety as well as communication skills. While the students can enrol in faculty wide courses covering ethic, health and safety and professional communication skills, the differences between different engineering disciplines and their associated industries demands the stream courses to reflect on these CLOs more comprehensively.

Future Action

- Questions are Googled before and after the exam. Before ensures the questions are not easy to answer with simple searches. After ensures that the papers have not been uploaded during the exam.
- Wherever practical, more than one set of question papers are prepared to include variability and avoid possible unfair means to attend the online exam.

Summary

A curriculum mapping exercise has been carried out for PETRAH Petroleum Engineering stream of the 3707 Bachelor of Engineering (Honours) program at UNSW. The stream provides good coverage of all the Engineers Australia Stage 1 Graduate Competencies. It is particularly strong in specialist engineering knowledge, the use of design, analysis and computation tools, and design of innovative engineering solutions

6. Demonstrate proficiency in applying engineering techniques, tools, and resources

7. Engage in effective professional communication

8. Demonstrate in-depth as well as broad understanding of the specialist body of knowledge of petroleum engineering

Development of Stream Learning Outcomes

Initial development of the Stream Learning Outcomes (SLOs) involved several staff teaching in each of four major petroleum engineering practices in the stream. The draft was then presented to the School Teaching and Learning Committee (TLC) for discussion. This discussion also investigated student and industry feedback and the required amendments were made by TLC, before the draft is presented and discussed with petroleum discipline lead and the School Management Committee (SMC). The final SLOs were then resubmitted to the TLC, SMC and IAB in turn for final endorsement.

Curriculum Mapping

To determine the electives to use in the mapping, the electives representing the