

Maths Prerequisite Working Group progress update for EC (30 April, 2025)

We were tasked to evaluate the implications of removing the HSC mathematics prerequisites from the Engineering undergraduate degrees.

Why? “Increase diversity and accessibility for the university degree programs”.

Context

USyd introduced HSC math prereqs in 2019 (many Go8 do not have math prereqs).

2015 analysis (Tim Wilkinson et al) shows that ATAR is one of the best predictors of success in undergraduate Engineering.

Our current entry requirements:

ATAR 90, and

Advanced Mathematics (Band 4)

Mathematics Extension 1 or 2 (Band E3)

Preliminary take-away messages

Would dropping the math prereqs...

1. increase the failure rate? **probably not**
2. increase diversity/accessibility? **probably not for some metrics**
3. decrease morale amongst academics? **likely yes**

Preliminary analysis

Data = 4000 Engineering students, HSC mathematics grades, first-year math-heavy uos.

1. AMME1802 (Eng. Mechanics), Ext 1 is assumed knowledge.
2. Students with Ext 2 or Ext 1 mostly do well in AMME1802 — as one might expect.
3. Inconclusive for students with Adv (since the range of HSC grades is narrow).

There are not enough students who did poorly in HSC math to use as a proxy for students who don't have HSC math.

We expect similar results for other math-heavy uos.

Preliminary Analysis of diversity metrics

Amongst the 8 faculties, we rank:

- ▶ 1st on NESB
- ▶ 2nd on Low SES
- ▶ equal to all others on Remote
- ▶ 6th on Regional
- ▶ 7th on Disability
- ▶ 8th on Indigenous

46% of NSW students doing Advanced Mathematics (2023) were women (40% Ext 1, 33% Ext 2). Perhaps math prereqs are not the reason for low number of women in our degrees.

Consequences of dropping (1):

Anecdotally, dropping will not change the makeup of the cohort — the failure rate will not increase, diversity will not improve.

1. Prior to the introduction of the math prerequisites, there were only a handful of students enrolled who didn't meet it.
2. High ATAR is one of the best predictors of success in our degrees, and our entry requirements have this at 90.
3. In open days we already impress on students and parents that mathematics and analytical thinking is required to succeed in our degree.

Consequences of dropping (2):

1. Academics have told us, often quite strenuously, that dropping will lead to overwork (due to increased teaching, co-ordinating, complications in the degree structures), and even lower morale.
2. We worry that dropping will lead to bad publicity of falling standards — but, (i) units will still carry assumed knowledge, and (ii) as far as we know Science (which dropped in 2025) has not suffered bad publicity as a result.

Targeted examples...

1. Khuda women in STEM program
2. Indigenous STEM Education Project (CSIRO)
3. Pūhoro STEM Academy (NZ, to help Māori high school students)