

TISC Consultation on Year 12 Course Incentives
Response by the Australian Mathematical Sciences Institute
September 2024

Introduction and executive summary

AMSI welcomes the opportunity to respond to the TISC Consultation on Year 12 Course Incentives. AMSI is a peak body representing the mathematical sciences (which includes mathematics, statistics and data science) in Australia, across the pipeline from school education, university and the workforce. As such we are well placed to provide comment relating on Year 12 Course Incentives, and the transition between school and university.

AMSI has 40 members, spanning universities, government agencies, professional societies and corporates. Our WA members are the University of Western Australia, Curtin University and Murdoch University.

Every year AMSI collects and published data on year 12 mathematics enrolments across Australia, with a particular focus on participation rates in *Specialist Maths* and *Maths Methods*. See AMSI's [Year 12 Mathematics Participation Report Card](#). These subjects include introductions to calculus and are intended to prepare high school students for university study, particularly in the mathematical sciences, and the broader STEM, including science, engineering and IT.

The longitudinal data over the last decade shows that the proportion of *Specialist Maths* and *Maths Methods* students have reached alarming new lows, with only 9% and 18%, respectively, now studying these subjects. The drop in maths participation rates comes at a time when demand for maths grads is growing, with roles relating to our growing data driven economy, such as those in data science and analytics in urgent demand. Maths graduates are also needed in logistics and optimisation, which are critical to the resources sector and the WA economy.

1. *What is your view on providing incentives to ensure sufficient numbers of students are studying Year 12 courses that align with the changing needs of Western Australia's economy and society?*

Encouraging the study of *Specialist Maths* and *Maths Methods* is vital to ensure that a sufficient pool of students have the background to undertake degrees in the mathematical sciences. Also note that the study of these subjects is critical for the broader STEM, including disciplines such as engineering, ICT and science degrees.

In light of declining Year 12 participation rates a range of incentives at the State level, are necessary to encourage students to select higher mathematics subjects.

Assuming incentives for particular Year 12 courses are continued:

2. *How can Western Australia best incentivise Year 12 students to study particular Year 12 courses/fields of education?*

State-based incentives are needed to signal the importance of higher mathematics study at Year 12. These incentives should focus on students in junior to middle high school, and their parents and teachers.

The ATAR system, with its ranking of students from 0 to 99.95, is well understood by students, parents and teachers, so incentive schemes need to be based on the ATAR rank.

AMSI believes that the current bonus system, which increases the ATAR, for students studying higher maths subjects, should be retained.

Alternatively, if the current bonus system is removed then a state-based selection rank system should be adopted, where students also receive a ATAR-like selection rank, and easily understandable information on the increase to the selection rank, if higher mathematics subjects are chosen.

3. *What impact(s) would those approaches have on other Year 12 students, teachers, academics, schools, tertiary institutions, and other stakeholders?*

An incentive scheme for the study of higher mathematics will reinforce the messaging to all stakeholders, on its importance to student's future career options and to the WA economy.

It will also encourage WA secondary schools to offer *Specialist Maths* and *Maths Methods*.

4. *How would you ensure any incentives for Year 12 students to study particular Year 12 courses/fields of education have a neutral impact on Year 12 students studying those courses/fields of education without an incentive?*

Any incentives to study higher mathematics imply that fewer students will study other subjects. Thus, it is not possible to have a neutral impact.

5. *What other approaches to incentivise final year secondary students to study particular courses or fields of education in use elsewhere in Australia or in other countries could be of interest to Western Australia?*

AMSI has just held an Industry Teacher Day in Melbourne, for maths teachers and careers advisors. This Day brought together academics and industry, for teachers to learn about the exciting careers available in the mathematical sciences, so in turn teachers can then help motivate their students to study higher mathematics at Year 12.

AMSI is willing to offer an Industry Teacher Day in Perth, if support is available.

6. *What are preferred approaches for selecting Year 12 courses/fields of education to be incentivised?*

An analysis of the future WA workforce should be undertaken, with a focus on growth sectors and occupations facing future shortages. A mapping to key enabling Year 12 subjects, such as *Specialist Maths* and *Maths Methods*, will identify the subjects that need to be incentivised.

Government priorities should also be an important consideration in deciding what subjects need to be incentivised. For example, WA universities have been allocated over 400 Commonwealth supported places in STEM courses to help grow the skilled workforce required to deliver the AUKUS nuclear-powered submarine pathway. Mathematics is one of the eligible courses in the AUKUS program and is also a key enabler, for other supported courses, such as those in Engineering.

Sincerely,



Professor Tim Marchant
Director, AMSI