 Key Information for implementing the new Science Extension syllabus

About the syllabus

Science Extension is a new Year 12 science course that will be offered for the first time in 2018 (Term 4). This course is aimed at students who

* Have shown an interest in science.
* Have demonstrated an aptitude in the other stage 6 science courses.
* Intend to pursue science, engineering, health and medical science courses at University.

The course focuses on the scientific research process. In addition to the content that is covered in the course, students will also engage in a major research project, which may be mentored by research professionals. At the completion of the course, students will produce a research report that highlights the key findings of the project.

Key content

The course consists of 4 modules and a research project. This is summarised in the following table:

| Module | Title | Indicative hours | Runs alongside\* |
| --- | --- | --- | --- |
| 1 | The foundations of scientific thinking | 10 | Scientific Research Project |
| 2 | The scientific research proposal | 10 | Scientific Research Project |
| 3 | The data, evidence and decisions | 20 | Scientific Research Project |
| 4 | The research report | 20 | Scientific Research Project |

\* The research project runs concurrently with the modules taught in the course.

Research Project

Students will undertake a research project in which they will engage with and familiarise themselves with the scientific process. Although it is not mandatory, it is expected that students will be mentored by research professionals (e.g. at University, Observatory, Museum). This allows students to interact with research professionals and experience scientific research at a personal level. Students may also investigate primary research data (e.g. data from the CERN Large Hadron Collider experiments or the Kepler Project). Research projects may be extensions of depth study projects that students undertook in the other stage 6 science courses.

The Research Portfolio

Students are expected to maintain a Portfolio that documents their research experience. All aspects of the research project must be recorded in the portfolio, including discussions with teachers & research mentors, literature searches, planning of experiments, data collection and analyses, as well as conclusions. The portfolio will form the basis of two assessment tasks, as well as the basis of the research report. The portfolio should contain the following sections:

* Section 1: Planning
* Section 2: Data collection and analysis
* Section 3: Reflections

Research report:

The research report should be formatted as a scientific report or paper (2500 – 3000 words). It should include the following sections:

* The Title
* The Abstract
* Literature Review
* Scientific Research Question
* Research Project
* Scientific Hypothesis
* Methodology
* Results
* Discussion
* Conclusion
* Reference List
* Appendices

Assessment

The assessments consist of school-based tasks, as well as the HSC examination. The school-based assessments are shown in the following table:

| Assessment Task | Details | Weighting (%) |
| --- | --- | --- |
| 1 | Related to section 1 of the portfolio | 20-40 |
| 2 | Related to section 2 of the portfolio | 20-40 |
| 3 | The research report | 40 |

The HSC examination is proposed to be a computer-based test (2 hr + 10 minutes reading time). Students will have access to their research report (previously uploaded to NESA) at the examination. The proposed structure of the examination is as follows:

* Section 1: Related to module 1 (15 marks)
* Section 2: Related to students’ research experience - modules 2-4 (35 marks)

New approaches and pedagogies

There are a number of innovations in the Science Extension course. These include:

* Teachers – In this course, teachers will assume a supervisory role in the relationship between the student and the research mentor. As the content modules are closely related to the research project, teachers will be able to implement various student-centred pedagogies (e.g. inquiry-based approaches) in the classroom to inspire students to achieve to realise their potential.
* The research project – Although research projects are an integral aspect of high school science (stages 4-6), the project in the Science Extension course is novel in that students may be mentored by research professionals. This will expose students to high level scientific research and provide them with the opportunity to be involved in scientific innovation and discovery, as well as scientific practice at the highest levels.
* Data analysis – Analysis of large datasets (big data) is becoming an essential aspect of not only scientific investigations, but also in other areas, such as finance and social science. In this course, students will generate, manipulate and analysis datasets using various statistical models (e.g. t-tests, chi-squared tests and ANOVA). Such skills will be valuable for students in their tertiary studies and in many workplaces. These concepts are not parts of other syllabuses.