

Extension Science

The following contains a description of the course we offer to students at St Marys Senior High. It is intended as a guide to help you select your subjects and you should read it carefully.

Please note:

- The details given represent the way that the course is delivered at St Marys Senior High and may involve different choices from the way other schools might operate the same course.
- Classes can only be formed where sufficient students select the particular course. The fact that a course is listed here is not a commitment to run the course in a particular year.
- The arrangements for particular courses are subject to change for a variety of reasons.
- HSC students may elect to take extension courses which we offer in English, French, History, Japanese, Mathematics and Music.

Extension - Course Details

| Units | Type | ATAR | Faculty Teaching This Course |
|-------|---|--|------------------------------|
| 1 | Board Developed Course – Examinable at the HSC, marks can be used to count towards an ATAR | A – Counts towards an ATAR with no restrictions | Science |

What will I be doing in this course?

This year 12 course is designed for students who have attained a very high level of achievement in one or more of the Science disciplines in Year 11 and are planning to pursue further study in Science, Technology, Engineering or Mathematics (STEM) based courses offered at the tertiary level. Extension Science may be studied in addition to either 2 or 4, or 6 units of Science Courses, that is up to a total of 7 units of HSC Science Courses.

The Science Extension course is for Stage 6 syllabus focuses on the nature, development and processes of Science. The course requires students to engage with complex concepts and theories and to critically evaluate new ideas, discoveries, and contemporary scientific research. They are challenged to examine a scientific research question drawn from one or more of the scientific disciplines of Biology, Chemistry, Earth and Environmental Science and Physics. In doing this students extend their knowledge of the discipline/s, conduct further analysis and authentic investigations and, uniquely for this course, produce a detailed scientific research report that reflects the standards generally required for publication in a scientific journal.

Through designing and conducting their own scientific research, initially using small data sets, students deepen and build upon their understanding of analysing and interpreting data. Students are provided with opportunities to refine and extend their skills of Working Scientifically by applying the processes to contemporary authentic scientific research, gathering and examining evidence in the form of large data set(s), modelling and critically assessing and evaluating the

gathered information. Students interrogate and refine their ideas of and about science through analysing historical cultural observations and significant scientific research within the relevant ethical frameworks and philosophical arguments of the time.

The study of Science Extension Stage 6 aims to enable high achieving students, with a passion for science, to explore the development of the scientific process over time and to undertake authentic scientific research to produce a Scientific Research Report and Portfolio.

The Scientific Research Report

A scientific research report or paper (2500-3000 words) has a formal structure. Regardless of the discipline the report is prepared in such a way that it can be followed by academics or other scientists. The Scientific Research Report is a result of the student’s own work and must adhere to the principles and practices of good scholarship, as identified in the HSC: All My Own Work course. While students may collaborate with and draw upon the expertise, knowledge and data held by others in developing their Scientific Research Report and Portfolio, this assistance must be referenced using accepted protocols. All scientific research must be sensitive to community expectations in relation to the question being interrogated. Students must adhere to ethical practices in the collection and analysis of data and the communication of results.

The Scientific Research Portfolio

The Scientific Research Portfolio supports and guides the development of the Scientific Research Report. It provides a record of the processes and documents the information gathered, the analysis of data and the development of the report.

The portfolio is an active, working, purpose-built set of documents that facilitates organisation and ensures that students reflect on their work and maintain information and records of their actions and findings. It is used to evidence students’ original work and maintain records of teacher feedback, comments and observations. The portfolio also provides evidence for the acknowledgement of secondary-sourced information used and clarifies the scientific research methodology, leading to a logical evidence-based Scientific Research Report.

| Year 12 Course Structure and Requirements | | | |
|---|---|------------------|---|
| Year 12 Course (60hrs) | Students develop a response to a scientific research question that requires the analysis of data from one, or a combination of, the following disciplines: <ul style="list-style-type: none"> • Biology • Chemistry • Earth and Environmental Science • Physics | | |
| | Modules | Indicative Hours | Scientific Research Project |
| | Module 1 The Foundations of Scientific Thinking | 10 | Establish an area for scientific research |

| | | |
|---|----|--|
| Module 2 The Scientific Research Proposal | 10 | ↓ Formulate the question for research |
| Module 3 The Data, Evidence and Decisions | 20 | ↓ Find or generate the data. Apply methodologies to analyse the data for the Scientific Research Project |
| Module 4 The Scientific Research Report | 20 | ↓ Develop the Scientific Research Report and offer solutions to the scientific research question |
| Scientific Research Portfolio and Report | | |

What should I be able to do at the end of this course?

Students will develop knowledge and understanding of the nature of research in Science through investigation into an area of interest across the disciplines of Biology, Chemistry, Earth and Environmental Science and Physics.

This course will prepare students for further tertiary studies in Science and Engineering.

How will I be assessed in this course?

- Students must propose and develop a research question, formulate a hypothesis and develop evidence-based responses in the form of a Scientific Research Report, which is supported by a Scientific Research Portfolio.
- Science Extension challenges students to apply the Working Scientifically processes in a way that is determined by and, appropriate to, the scientific research over an extended period of time.

Students are challenged to:

- define and modify questions and/or hypotheses
- define, refine or modify plans and procedures
- conduct further investigations
- conduct further secondary scientific research.

A major focus of the processes is the communication of evidence-based conclusions



and suggestions for future scientific research. Methodologies can be refined, and further investigations and scientific research generated as a result of unexpected observations. Knowledge and understanding of science and its processes are essential for scientific research at the tertiary level and for engagement in current and future scientific endeavours.

How will this course help me in the future?

- The *Science Extension Stage 6 syllabus* focuses on the nature, development and processes of Science. The course requires students to engage with complex concepts and theories and to critically evaluate new ideas, discoveries, and contemporary scientific research. They are challenged to examine a scientific research question drawn from one or more of the scientific disciplines of Biology, Chemistry, Earth and Environmental Science and Physics. In doing this students extend their knowledge of the discipline/s, conduct further analysis and authentic investigations and, uniquely for this course, produce a detailed scientific research report that reflects the standards generally required for publication in a scientific journal.
- Through designing and conducting their own scientific research, initially using small data sets, students deepen and build upon their understanding of analysing and interpreting data. Students are provided with opportunities to refine and extend their skills of Working Scientifically by applying the processes to contemporary authentic scientific research, gathering and examining evidence in the form of large data set(s), modelling and critically assessing and evaluating the gathered information.
- Students interrogate and refine their ideas of and about science through analysing historical cultural observations and significant scientific research within the relevant ethical frameworks and philosophical arguments of the time.
- The course is designed for students who have attained a high level of achievement in one or more of the Science disciplines in Year 11 and are planning to pursue further study in Science, Technology, Engineering or Mathematics (STEM) based courses offered at the tertiary level.