Da Vinci Programme

The Da Vinci Programme is one of the keystone programmes in NUS High School and it complements the curriculum to develop the scientific minds of our students. The 6-year programme aims to develop skills for research, innovation and enterprise in multiple disciplines. Students undergo a series of structured programmes in the first four years in order to prepare them to carry out a research project in their senior years.

Da Vinci programme will nurture students' appreciation and understanding of the multi- and inter-disciplinary nature of knowledge and research so that they can be polymaths in this fast-changing world. We strive to help students stay at the frontier of research and innovation. We want to inculcate the observation, communication and thinking skills vital for research and innovation.

NUS High School is fortunate to have many organizations supporting the Da Vinci programme. In particular, many schools and faculties in NUS provide research opportunities for our students through expert guidance and mentorship. Our key partners include Science Centre Singapore, DSO National Laboratories, Defence Science and Technology Agency (DSTA), the Agency for Science, Technology and Research (A*STAR) and the Nanyang Technological University.

All students will present their research at our annual NUS High School Research Congress. They are also encouraged to interact with their peers locally and internationally, exchange ideas through oral and poster presentations as local and overseas science fairs and conferences.

All Da Vinci Programme Modules will be awarded *Excellent, Merit, Satisfactory* or *Unsatisfactory* according to performance (i.e. no Grade Points are given).

DV1101	*Da Vinci Foundation (Year 1 Semester 1)*
	This semester-long module aims to inculcate essential habits of the scientific mind; and to develop the competencies, skills and ethics for research, innovation and enterprise. We aim to have students thinking creatively and solving problems innovatively in order for them to have a sense of excitement for the future. The programme will equip students with a basic set of idea generation tools, and introduce the technical skills needed to execute their ideas. Students will also be brought on fieldtrips to widen their perspective. Another focus will be to encourage interdisciplinary thinking. Much innovation and excitement can be found at the boundaries between traditional subject silos. A series of activities will provide students with a broad perspective of the multi- and inter-disciplinary nature of things in the real world.
DV2101	*Design & Engineering (Year 1 Semester 2 or Year 2 Semester 1)*
	This semester-long module aims to give students the intermediate skills they need to turn their ideas into reality. The semester-long Design & Engineering module will build on the skills taught in DV1101. Students will learn to work with wood and plastics, as well as basic electronics. They will also learn skills such as computer-aided design and be introduced rapid prototyping.

DV2102	*Creative Problem Solving (Year 1 Semester 2 or Year 2 Semester 1)* Problem solving is applied thinking, an integral part of all learning for students today. This semester-long programme therefore is a platform where students, working in teams, learn to apply a wide range of techniques to generate creative solutions to existing or future problems contained within complex social contexts. Besides equipping students with the skills and strategies of solving problems, basic research skills and oral presentations skills will be highlighted as well. One of the frameworks used will be that of the Future Problem Solving Programme (FPSP), a cohesive and sequential process that emphasizes teamwork and ethical thinking in anticipating future challenges.
DV2103	*Science Presentations (Year 1 Semester 2 or Year 2 Semester 1)* Scientists, engineers and mathematicians need specific presentation skills. It is essential that scientists are able to communicate effectively with each other as well as with general public. This module will aim to allow students to acquire basic scientific presentation skills and practise them on their peers. By listening to each other's presentations, students will get exposed to a variety of presentation skills as well as get to learn interesting scientific facts from each other. Students will also be encouraged to ask and think about critical questions pertaining to the research process.
DV2104	*Innovation Programme (Year 2 Semester 2)* In this module, students will apply what they have learnt over the first three semesters to conceptualize, design and built an innovative product or solution. They will work in grounds to identify the problem they wish to solve, craft the solution, develop the prototype and present it to their peers. Students who are inclined towards Math or Science research may be allowed to propose and carry out an innovative research project in their chosen field.
DV3101	*Research Methodology (Year 3 Semester 2)* In this module, students will undergo training in scientific methodology and learn the basics of research and the techniques required to unravel the mystery of their research question. Students will also pick up the skills like literature review, scientific writing, how to conduct a proper experiment and result analysis.
DV4210	*Da Vinci Seminar Series (Year 4 Semester 1)* Reading and critically analyzing journal articles are essential research skills. They set the stage for meaningful future research to be carried out. This elective module will provide students with a platform for critical analysis of research literature so as to synergize existing knowledge and generate new ideas. This exciting module aims to cultivate self-directed learning amongst students and eventually allow them to be able to discuss issues and ideas meaningfully.

DV3201	*Advanced Design and Engineering (Year 3/4)* This elective module aims to extend students' understanding of engineering design process through the application of math, science, and technology to create devices and systems that meet human needs. Students will learn about engineering through realistic, hands-on problem-solving experiences. This module will teach advanced skills that will enable the student to design and implement customized automation and data acquisition solutions to meet research and engineering goals.
DV4201	*Independent Research Project (Year 4)* During the Foundation and Advancement Years, students who have the aptitude and passion for research in any field can embark on the Independent Research Project (IRP) as an individual or in a team (IRP is not a graduation requirement). Students who are doing research for the first time must read DV3101 Research Methodology concurrently. These projects may also be linked to external programmes like the Science Mentorship Programme, Nanyang Research Programme, the Young Defence Scientists' Programme and the National Weather Study Project. Students can also partner an external research organization for their project.
DV5101	*Advanced Research Project (Year 5 or 6)* During the Specialization Years, all students must embark on their Advanced Research Project (ARP) in the field of mathematics, science or engineering. Successful completion of the ARP is one of the graduation requirements for our students. Students can do their ARP as individual or in a team of not more than three members. Students who are doing research for the first time must read DV3101 Research Methodology concurrently.