NUS HIGH SCHOOL of Math & Science

PROGRAMME OF STUDIES FOR THE CLASS OF 2025

correct as of 14 Feb 2025

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ABOUT NUS HIGH SCHOOL

The NUS High School of Mathematics and Science is an independent, specialised co-educational school in Singapore that offers its own unique six-year diploma programme for Math and Science talents. Established in 2005 by the Ministry of Education (MOE) Singapore and the National University of Singapore (NUS), we offer the only school-based gifted education programme in Singapore for Math and Science talents. The curriculum is designed for the top 180 students who are gifted in and have passion for math and science in each cohort. The students graduate with the NUS High School Diploma, which is officially accredited by MOE and NUS and is recognised by renowned local and overseas universities.

The compacted and accelerated curriculum engages the students. All students will go beyond the math and science standard of other Singapore school as well as complete compulsory research / innovation project as a graduation requirement. It also allows the best to skip courses and accelerate even further to take university courses. Students enjoy self-directed learning, multi-disciplinary curriculum and inter-disciplinary projects. With the support of tertiary institutions and the industry, the school's academic and character-building programmes develop students who can wrestle with complex problems and think differently; who are not afraid to venture into the unknown, innovate and provide unique solutions for the betterment of humanity.

Our Mission

To inspire and shape the future of education in mathematics and science.

Our Vision

Future-ready Pioneers, Humanitarians and Innovators for the world.

ACADEMIC PROGRAMME OF STUDIES

The Academic Programme of Studies is the prescribed syllabus at every stage of NUS High School curriculum. It outlines the curriculum structure, modular system, grading system as well as promotion and graduation requirements. It will be updated regularly to reflect all academic courses that are offered to the Class of 2025.

1. Curriculum Structure

NUS High School designs and implements a unique curriculum that is relevant, deep, rigorous and inspiring to students who have the aptitude in and passion for Math and Science. The NUS High School curriculum allows students to have more flexibility for deeper exploration in their learning as they move up from the Foundation Years to the Specialisation Years.

Foundation Years	Years 1 - 3	Students will acquire the fundamentals and build their base knowledge. They will have the opportunity to enhance and apply their knowledge.
Specialisation Years	Years 4 - 6	Students will be engaged in doing advanced courses in their areas of specialisation.

1.1 Modular System

The NUS High School curriculum is based on a modular system. The school offers our students a diverse spectrum of courses and enriches them through our multidisciplinary approach. It also provides the rigour and depth of curriculum while allowing flexibility and breadth to the learning so that students can develop to their full potential. Students can progress at their own pace and choose from a wide range of courses.

1.1.1 Types of Courses

CORE	Essential courses with the core knowledge and skills expected of a student majoring in the discipline at the high school level in all academic subjects other than Mother Tongue.
ELECTIVE	Courses that build on the Core courses to give greater depth and deeper understanding to students for the subject. It provides flexibility of choice with further different focus within the discipline. It is not compulsory to take elective courses.
ENRICHMENT	Courses that are offered to students who wish to broaden their interest It is not compulsory to take enrichment courses.
HONOURS	Honours courses are advanced courses designed at university undergraduate level for students specifically reading Mathematics or Science subject at Major with Honours level. Honours courses are offered in Years 5 and 6. It is not compulsory to take Honours courses.
MOTHER TONGUE LANGUAGE CORE	Essential Mother Tongue courses with the core knowledge and skills expected of a student at the pre-tertiary level. The courses follow the GCE 'O' or 'A' level syllabus.

1.1.2 Course Codes

Each course of study has a unique course code consisting of a two-letter prefix and four digits:

- First two letters: Subject code that denotes the discipline (see List of Subject Codes)
- The first digit indicates the academic level of course offered.
- The second digit is used to indicate the type of course: 1 for **Core**, 2 for **Elective**, 3 for **Enrichment**, 4 for **Honours** and 5 for **Mother Tongue Language Core** courses which follow the MOE syllabus.
- The last two digits indicate the course number.

For some courses, there is a suffix letter.

- A letter 'A' indicates that the course is a preclusion and taken in lieu of the core course, with different assessment weighting.
- A letter 'M' indicates an approved Mother Tongue Language in-lieu course conducted in MOE approved language centers.
- A letter 'V' indicates that the course is offered by external agencies or Institutes of Higher Learning, but is considered a school course.

List of Subject Codes

AR Art	**CM** Chemistry	**EN** English Literature	**HD** Hindi	**ML** Malay	**TL** Tamil
BG Bengali	**CS** Computer Science	**FR** French	**HY** History	**MU** Music	**UD** Urdu
BL Biology	**DV** Da Vinci	**GC** General Curriculum	**HU** Humanities	**PC** Physics	
CE Character & Citizenship Education	**EC** Economics	**GE** Geography	**JP** Japanese	**PE** Physical Education	
CH Higher Chinese	**EG** Engineering	**GJ** Gujarati	**MA** Mathematics	**PJ** Punjabi	
CL Chinese	**EL** English Language	**GM** German	**MH** Higher Malay	**TH** Higher Tamil	

Examples:

- **EL2131** is an English course (EL) taught at academic level two (2). It is a core course (1).
- **CM1331** is a Chemistry course (CM) taught at academic level one (1). It is an enrichment course (3).
- **MA2232V** is a Mathematics course (MA) taught at academic level two (2). It is an elective course (2) that is conducted at an external agency (V).
- **CH3531** is a Higher Mother Tongue Language course (CH) taught at academic level three (3). It is a Mother Language Core course that follows the MOE Syllabus (5).

1.1.3 Pre-requisite(s)/Co-requisites/Preclusions

Pre-requisite(s)	Courses which have to be satisfactorily completed in order to qualify to read the course that the student wants to register for. (Courses equivalent to the pre-requisites may also be accepted – please consult the relevant Department)
Co-requisites	Courses that are to be taken concurrently
Preclusions	Courses which have similar emphases and should not be taken together within a student's candidature

1.1.4 Units

Under the modular system, workloads are expressed in terms of Units. A unit of the effort, stated in terms of time, expected of a typical student in managing his/her workload. The UNIT-value of a course is derived by dividing the estimated total number of workload hours per week for that course by the unit factor of 2. For example, a 4-unit semester-long course would require 8 hours of work a week, including lessons in class, laboratory sessions, assignments, and independent or group work in a semester. A 6-unit year-long (2 semesters) course would require 6 hours of academic work per week for an academic year.

1.2 Foundation Years

Students are to read all Core courses of the following academic subjects during their Foundation Years – English Language, Mother Tongue, Mathematics, Computer Science, Biology, Chemistry, Physics as well as Humanities, Art and Music. Please refer to the respective academic Departments for details. Students are also expected to read courses under the *Da Vinci* Programme. Please refer to the *Da Vinci* Programme for details.

Compulsory Academic courses and Units in the Foundation Years

Year 1		**Year 2**		**Year 3**	
English Language & EN	8	English Language	6	English Language	6
Mother Tongue[1]	6	Mother Tongue[1]	6	Mother Tongue[1]	8
Mathematics & CS	8	Mathematics	8	Mathematics	8
Biology	4	Biology	6	Biology	6
Chemistry	4	Chemistry	6	Chemistry	6
Physics	4	Physics	6	Physics	6
Art & Music	4	1 from AR, MU, GE, HY & EN	4	Continue choice in Yr 2 (1 from AR, MU, GE, HY & EN)	6
Integrated Humanities	4	Integrated Humanities	2		
Da Vinci	*5*	*Da Vinci*	*5*	*Da Vinci*	*3*
Total[2]	**42**	**Total**[2]	**44**	**Total**[2]	**46**

[1] It is compulsory for students to take up Mother Tongue Language courses, with the exception of students who have been exempted by the Ministry of Education. The figures shown assume students read Higher Mother Tongue courses. Students who read Mother Tongue course will have 6 UNIT in Year 3 instead of 8 UNIT.

[2] The total number of units in the Academic Year of Studies excludes courses in the *Da Vinci* Programme as these courses do not have a Grade Point (refer to section 2.2 for details). *Da Vinci* Programme is reflected in this table to provide a complete representation of compulsory academic load.

1.3 Specialisation Years

Students are to complete the following during their Specialisation Years:

English Language	Students have to read all English Language Core courses from Years 4 - 6.
Mother Tongue	Students have to continue taking Mother Tongue courses, if they have not already fulfilled the requirements by Year 4. Please refer to the Mother Tongue Courses Offered, for details.
Three Compulsory Major Subjects	Students have to read **Mathematics** and **TWO Sciences**[1] as Major subjects. • Mathematics • Science Subject 1 • Science Subject 2
Advanced Research Project	Students have to complete an Advanced Research Project (ARP) in any Mathematics, Science or Engineering domain. It is part of the *Da Vinci* Programme.
***Optional* Major Subject**	Students ***may*** read ***ONE*** of these subjects as the fourth Major, provided they have met the pre-requisite requirements of the selected subject. i.e. students are allowed to read a ***maximum*** of **FOUR** Major subjects, which can be from the following subjects: • Science Subject 3[1] • Art • Economics • English Literature • Geography • History • Music
***Optional* Major with Honours**	Students ***may*** read any of the following subjects at Major with Honours level (refer to section 1.3.1), which is built on the Major curriculum. • Mathematics • Biology • Chemistry • Physics • Engineering • Computer Science

[1] Science Subjects include Biology, Chemistry, Physics and Computer Science

Compulsory Academic courses and Units in Specialisation Years

Year 4		Year 5		Year 6	
English Language	6	English Language	6	English Language	6
Mother Tongue[1]	8				
Mathematics	10	Mathematics	10	Mathematics	10
Science subject 1	8	Science subject 1	8	Science subject 1	8
Science subject 2	8	Science subject 2	8	Science subject 2	8
				Humanities[2]	2
		Da Vinci	*3*		
Total[3]	**40**	**Total**[3]	**32**	**Total**[3]	**34**

[1] This assumes students read Higher Mother Tongue courses and clear the MOE MT requirement. If not, students will continue to read Mother Tongue course(s) in Year 5 or even Year 6.
[2] A Humanities Capstone course for students who do not have a Major in Humanities, Art or Music.
[3] Total number of units in the Academic Year of Study excludes courses in *Da Vinci* Programme. *Da Vinci* Programme is reflected in this table so as to provide a complete representation of compulsory academic load.

1.3.1 Major with Honours

For Mathematics, Biology, Chemistry, Physics, Engineering and Computer Science, the school offers specialization at Major and **Major with Honours** level. For Major with Honours, students will cover topics that are beyond the typical high school curriculum. Students who have maintained a consistently high achievement in the courses that they have read before the Specialisation Years may qualify, and be approved by the academic Departments, to read their choice(s) of Major subject(s) as Major(s) with Honours.

To complete a Major with Honours, an additional 2-UNIT Honours course must be read in every semester in Year 5 and 6 in addition to the Core courses read at the Major level.

2. Grading System

2.1 Assessment

Students are assessed through a combination of Continual Assessments (CA) and End-of-Semester Examinations. Continual Assessment can be based on quizzes, assignments, tests, practicals, projects, reports, presentations, etc. Students' academic progress will be noted by their subject teachers and mentors, who will be able to identify areas of difficulty and advise appropriate action.

2.2 Grade Point System

Academic performance for **CORE** and **ELECTIVE** courses is measured by Grade Points on a 5-point scale (including Mother Tongue Language courses):

Grade	A+	A	A-	B+	B	B-	C+	C	D+	D	F
Grade Point	5.0		4.5	4.0	3.5	3.0	2.5	2.0	1.5	1.0	0

D grade and above are considered as passing grades.

Students who exercise the option to drop their 4th major by the end of Year 4, the 4th major courses will be assigned with a Satisfactory (S) or Unsatisfactory (U) grade. These courses are excluded from Graduation GPA computation.

Satisfactory (S)	if the 4th major course has been awarded a D grade or above
Unsatisfactory (U)	if the 4th major course grade is an F

Academic performance for **HONOURS**, **ENRICHMENT** and **DA VINCI** Programme courses is measured as shown in the following grade table.

Distinction	Merit	Pass	Unclassified

No Grade Points are awarded for Honours courses, Enrichment courses and Da Vinci Programme courses. The performance of these types of courses is not used in the computation of GPA.

Additional Indicators for Courses	Exempted (EXE)	Students exempted from taking a Core course by the relevant academic Department will be awarded the Unit(s) but will not receive a Grade Point. Refer to section 2.4.
	In Progress (IP)	For courses that extend more than one semester, the Grade Point will be given at the conclusion of the course. The status “IP” is assigned during the intervening semesters.
	Accelerated	Students completed a higher-level course. Refer to section 2.5.
	Completed	Students completed the course.
	Repeated	Students repeated the course.
	Excluded	The course was excluded from Graduation GPA computation.

2.3 Grade Point Average (GPA)

Academic progress is tracked by the Grade Point Average (GPA), which is the weighted average grade point of all courses taken by a student. Therefore, a student's GPA is the sum of the course grade points multiplied by the number of UNITs for the corresponding course, divided by the total number of UNITs. This is represented as follows:

$$\text{GPA} = \frac{\text{Sum (course grade point x units assinged to course)}}{\text{Sum (units assigned to all courses used in calculating the numerator)}}$$

All GPA scores will be computed to 1 decimal place.

Courses with no grade point such as Honours, exempted and Enrichment courses do not contribute to GPA.

There are two different GPAs with different time frames and purposes – Promotion GPA and Graduation GPA.

Promotion GPA	Graduation GPA
• To determine promotion to next Academic Year of Study	• To determine the Classification of Diploma (refer to section 3.3)
• Year 1 to 5	• Year 3 to 6
• Shows the academic performance in the Academic Year of Study	• Shows the academic performance of all the semesters from Year 3 Semester 1 up to the current semester

• Grade points of ALL Core courses including Mother Tongue Language (MTL) Core courses and Elective courses read in the Academic Year are used for the computation of the Promotion GPA	• The higher value of either computation
	  • Grade points of ALL Core courses and Elective[1] courses but excluding MTL Core courses
	  • Grade points of ALL Core courses and the MTL Core courses read in the final two years of academic studies to fulfill the MOE MTL requirement[2] as well as Elective[1] courses

[1] Electives are selected by the system, which will maximize the GPA for students. Exception is at Year 6 Semester 2, where students will select electives of their choice for inclusion into their Graduation GPA.
[2] For students taking Higher Mother Tongue Language, it will be courses in Year 3 and 4 (total 16 UNITs). For students taking Mother Tongue Language, it will be courses in Year 4 and 5 (total 16 UNITs).

2.3.1 Subject GPA

The Subject GPA is computed from grades of all Year 3-6 Core and selected Elective[1] courses in that subject. The elective courses that are included in these Subject GPAs are the same set that students have selected for inclusion into their Graduation GPA.

The following Subject GPAs will be displayed in the Academic Transcript:

Subject GPA	Additional Remarks
English Language	Nil
Mother Tongue Language	The Mother Tongue Language (MTL) Subject GPA will include MTL Core courses read in the final two years of academic studies to fulfill the MOE MTL requirement as well as selected elective MTL courses. Students who read MTL Syllabus B or are exempted from MTL by MOE will not have a MTL Subject GPA.
Mathematics	Nil
Biology	Nil
Chemistry	Nil
Physics	Nil
Humanities, Art and Music	For a student who does a 4th Major in Art, Economics, English Literature, Geography, History or Music, the Humanities, Art and Music Subject GPA will include the area of Major in brackets. For example, a History Major student will have a Humanities, Art and Music (History) Subject GPA.
Computer Science	Only for students who read Computer Science at Major or Major with Honours level

2.4 Exemption from Courses

Teachers will recommend suitable students for diagnostic tests. Students can be granted exemption from reading a course if they fulfil the following conditions:

- Excellent performance in diagnostic tests and;
- Other Department requirements, subject to approval

Students fulfilling these conditions will be granted “EXE” status for that particular course and no grade point is awarded. Units are fulfilled and will be reflected in the semester’s progress report when the student is granted the course exemption. Courses that are exempted will not affect Promotion GPA, Graduation GPA or Subject GPA since it has no grade point. Interested students who wish to seek course exemption should approach the respective academic Departments for more information.

2.5 Acceleration of Courses

A student can accelerate his/her studies by reading courses at an earlier semester(s) as compared to peers in the same academic level provided he/she meets the course's pre-requisite and gain approval from the Academic Department. For example, a Year 2 student may accelerate to read MA3131 in his/her Year 2 Semester 1 of study. The grade of the accelerated course MA3131 will be reflected in the Year 2 Semester 1 progress report and computed into the Promotion GPA just like all courses he/she read in that semester. However the grade of MA3131 will be computed into the Graduation GPA when he/she is in academic Year 3.

2.6 Failing and Repeating Courses

Students who fail a **Core** course (F Grade) shall sit for a Viva. A student who passes the Viva will be given a D grade and the student will be deemed to have completed the core course. For GPA computation, the D grade will be used instead of the original F grade. A student who fails the Viva will have to repeat the course when it is offered again. Upon passing the repeated course, the student will be awarded a new grade.

Students who fail a course which is a pre-requisite to a higher level course would not be allowed to read the higher level course. However, a student may read both courses concurrently, on a case-by-case basis, subject to department and school approval - however, this is not applicable to students who do not meet minimum Promotion GPA of 2.5 to promote to the next academic Year of Study.

Students who fail an Honours course (Unclassified Grade), shall not be offered a Viva. The student is deemed to be unsuitable to handle the rigour of the Honours curriculum, and will no longer be allowed to continue with the Department's Honours programme.

2.7 Optional Examinations

Years 5 and 6 students are encouraged to sit for the Advanced Placement (AP) Examinations, which are optional examinations offered by the United States College Board. AP results may enhance chances of gaining admission to overseas colleges/universities. For some universities, AP results are required for admission.

3. Promotion and Graduation

3.1 GPA for Promotion

A student must obtain a minimum Promotion GPA of 2.5 to promote to the next academic Year of Study. A student who is unable to meet the minimum Promotion GPA will repeat the Year of Study. This essentially means repeating all Core courses that a student has to read for that Year of Study.

3.2 Graduation Requirements

For students to graduate with the NUS High School Diploma, they must fulfill ALL the following requirements:

- Obtain a minimum Graduation GPA of 2.5
- Pass all Year 3-6 Core courses for English Language

- Complete respective Mother Tongue Language courses, as required (refer to Mother Tongue Language Policy)
- Pass all Year 3 Core courses for Mathematics, Biology, Chemistry and Physics
- Pass all Year 4-6 Core courses for Mathematics Major, two Science Majors and 4th Major (if applicable)
- Pass respective Year 3 Core courses for Humanities, Art and Music, and Year 6 (for non-Humanities/Art/Music Majors), as required
- Pass Research/Innovation Project

*Students must have completed at least **four** years of residency studies (including Years 4, 5 and 6) at NUS High School to graduate with the NUS High School Diploma.*

3.3 Classification of Diploma

Students who graduate are awarded the NUS High School Diploma with High Distinction, Distinction, Merit or Pass, based on the Graduation GPA computed to the first decimal place.

Class of Diploma	Pass	Merit	Distinction	High Distinction
Graduation GPA	2.5 – 2.9	3.0 – 3.9	4.0 – 4.4	4.5 – 5.0

----------END ----------

PROGRAMME OF STUDIES BY SUBJECT

Mathematics and Statistics

The mathematics curriculum at NUS High School is built upon important mathematical concepts such as number and algebra, geometry and measurement, function and graph, as well as probability and statistics.

Students will be able to apply these concepts in multiple ways using numbers, graphs, symbols, diagrams, and words. The learning process emphasises concept attainment through problem solving and reasoning, mathematical skills and tools, mathematical computation and modelling, and putting mathematics to work.

In the Foundation Years (Years 1 to 3), students are given a broad-based mathematical study of algebra, geometry, statistics and trigonometry. These topics serve as a foundation for many courses offered in the later years. Pre-calculus topics such as functions will also be taught. Students must be familiar with the properties of functions, the algebra of functions, the graphs of functions, the language of functions, and the values of trigonometric functions. Simple concepts of calculus are introduced too.

Students in the Specialization Years (Years 4 to 6) are required to read calculus at an extensive level that is comparable to calculus courses in colleges and universities. Vectors, numerical methods and mathematical proofs will also be touched upon. Students will also further their knowledge in pure mathematics and statistics. In addition, they have a range of electives to choose from to deepen their knowledge and widen their exposure.

The Department offers both Major in Mathematics and Major with Honours in Mathematics.

Mathematics Major is a compulsory subject major required for graduation with the NUS High School Diploma. To qualify for reading a Major with Honours in Mathematics, students have to achieve consistently excellent results in their Core courses.

Students are advised to follow the more appropriate choice on the basis of their academic performance. Students offering Major can opt to sit for the AP Calculus AB in their Year 5 whereas students offering Major with Honours can choose to sit for the AP Calculus BC in their Year 6. Students may also have the option of sitting for the AP Statistics in their Year 6. The respective AP examinations are optional.

The Department follows the general school policies on curriculum and assessment. For more details, please refer to the school curriculum framework.

The Department follows the general school policies on Exemption and Acceleration of Courses. Interested students shall approach the Head of Department for details on these matters.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1	MA1131	Core	Foundations in Math IA	This course aims to develop some understanding of the essential concepts of mathematics. The basic operations of numbers, fundamental concepts of algebra and geometry will be discussed. Topics include whole numbers, factors and multiples, fractions and decimals, approximation and estimation. This course also covers concepts of algebraic expressions, equations and manipulation, standard form, rules of indices and graphs of linear equations.	3	None			3	
1	2	MA1132	Core	Foundations in Math IB	This course aims to further develop an understanding of the essential concepts of foundational mathematics. Topics included are simultaneous linear equations, direct and inverse proportions, angle properties of triangles, quadrilaterals and polygons. This course also covers perimeter, area, volume and surface area of simple geometrical figures, symmetry, construction and loci. Coordinate geometry will be further developed as well. Students will also learn about various problem-solving heuristics and techniques.	3	MA1131			3	
1	1	MA1231	Elective	Math Olympiad Training I	This course provides students with a taste of Olympiad-type mathematics. Students are expected to participate in the Singapore Mathematical Olympiad (Junior).	2	None			1.5	
1	2	MA1232	Elective	Math Olympiad Training II	This course targets high ability students who are keen to prepare themselves rigorously for the Singapore Mathematical Olympiad (Junior).	2	MA1231, Department Approval		MA1232V	1.5	
1	2	MA1232V	Elective	Math Olympiad Training II	This course targets high ability students who are keen to prepare themselves rigorously for the Singapore Mathematical Olympiad (Junior). The course is taught by an external trainer.	2	MA1231, Department Approval			1.5	
1	1 or 2	MA1331	Enrichment	Fun with Fractals	This enrichment course explores the topic of fractals through a series of hands-on activities and experimentation. Students are expected to work in groups to produce a product demonstrating fractal properties by the end of the course.	2	None			1.5	
2	1	MA2131	Core	Foundations in Math IIA	This course builds upon the previous foundation. Topics covered include quadratic functions and inequalities, graphs of simple polynomials, congruency and similarity. Circle geometry, basic set language and notation will also be introduced. Topics like simple trigonometrical ratios, bearings and 3-dimensional problems are covered too.	4	MA1132			4	
2	2	MA2132	Core	Foundations in Math IIB	This course covers the essential concepts of basic data analysis, permutations and combinations, probability and surds. Circle geometry is further developed. Students will also learn about matrices and 2D vectors.	4	MA2131			4	
2	1	MA2231	Elective	Math Olympiad Training III	This course builds upon the previous Junior Olympiad training. It targets high ability students who are keen to prepare themselves rigorously for the Singapore Mathematical Olympiad (Senior).	2	MA1232, Department Approval		MA2231V	1.5	
2	1	MA2231V	Elective	Math Olympiad Training III	This course builds upon the previous Junior Olympiad training. It targets high ability students who are keen to prepare themselves rigorously for the Singapore Mathematical Olympiad (Senior). The course is taught by an external trainer.	2	MA1232V, Department Approval			1.5	
2	2	MA2232	Elective	Math Olympiad Training IV	This course targets high ability students who are keen to prepare themselves rigorously for the Singapore Mathematical Olympiad (Senior).	2	MA2231, Department Approval		MA2232V	1.5	

2	2	MA2232V	Elective	Math Olympiad Training IV	This course targets high ability students who are keen to prepare themselves rigorously for the Singapore Mathematical Olympiad (Senior). The course is taught by an external trainer.	2	MA2231V, Department Approval			1.5	
3	1	MA3131	Core	Foundations in Math IIIA	This is an important pre-calculus course that is a prerequisite for many advanced courses. It aims to model and solve problems involving quadratic equations using algebraic approach. Other solutions of equations will also be discussed through the use of remainder and factor theorem and partial fractions. Students will also solve inequalities involving absolute-valued functions. Exponential, logarithmic and trigonometric functions will also be explored in further details.	4	MA2132			4	
3	2	MA3132	Core	Foundations in Math IIIB	Students will be familiarized with the properties of functions, the algebra of functions and the graphs of functions. These functions include inverse functions, absolute value functions and piecewise functions. Students will be taught graphs of various functions and the solving of inequalities involving rational functions. Further trigonometrical identities and calculus are introduced, as well as Binomial Theorem.	4	MA3131			4	
3	1	MA3231	Elective	Math Olympiad Training V	This course builds upon the previous Senior Olympiad training.	2	MA2232, Department Approval		MA3231V	1.5	
3	1	MA3231V	Elective	Math Olympiad Training V	This course builds upon the previous Senior Olympiad training. The course is taught by an external trainer.	2	MA2232V, Department Approval			1.5	
3	1	MA3331	Enrichment	Foundation Mathematics (Bridging course)	This bridging course is compulsory for second intake students. It covers concepts like rules of indices, surds, set theory and geometric properties of circle. Students will perform simple operations with indices and surds, including rationalizing the denominator. The Cartesian coordinates system will be used to analyze geometrical situations and solve related problems. Basic counting techniques, probability and data analysis are taught too.	3	None			1.5	Bridging course (For new Yr 3 intake only)
4	1	MA4131	Core (Major)	Advanced Math IA	This course covers topics such as number sequences, summation of series, arithmetic and geometric series. There will also be discussion on the complex numbers system, where numbers can be expressed in Cartesian or polar forms. Students will learn to represent complex numbers in the Argand diagram. Further work will also be done on calculus and various methods of proofs.	5	MA3132			5	
4	2	MA4132	Core (Major)	Advanced Math IB	Transformation of graphs and vectors in 3D are introduced in this course. Further topics in calculus that will be covered include analysis of graphs, Maclaurin series (including binomial), integration techniques and applications of integrals to find area and volume.	5	MA4131			5	
4	1	MA4231V	Elective	Math Olympiad Training VI	This course targets high ability students who are keen to prepare themselves rigorously for the Singapore Mathematical Olympiad (Senior and Open).	2	MA3231V, Department Approval			1.5	
5	1	MA5131	Core (Major)	Advanced Calculus	This demanding and rigorous course introduces calculus typically covered in a university course. Continuity and differentiability of functions are introduced. Topics include fundamental theorem of calculus, Intermediate Value Theorem, Mean Value Theorem, limits of functions, asymptotic and unbounded behavior. First and second	5	MA4132			5	

					order differential equations and their applications to real-life problems will also be taught.						
5	2	MA5132	Core (Major)	Statistics	This course is a comprehensive study of various probability distributions and statistical concepts. Topics include Binomial Distribution, Poisson Distribution, Normal Distribution, Sampling Distribution, t-distribution, test of significance, correlation and linear regression. Exploring random phenomena using probability and simulation will also be discussed.	5	MA2132			5	
5	1	MA5231V	Elective	Math Olympiad Training VII	This course targets high ability students who are keen to prepare themselves rigorously for the Singapore Mathematical Olympiad (Open).	2	MA4231V, Department Approval			1.5	
5	1	MA5431	Honours	Linear Algebra	This Honours course introduces students to the operations on matrices and its applications to solving system of linear equations. Topics on vector spaces, linear transformations, rank and nullity, eigenvalues and eigenvectors will also be explored.	2	MA4132			2	+ Students majoring with Honours in Mathematics must complete at least 8 UNITs of the Honours courses.
5	2	MA5431V	Honours in lieu	NUS/MA2001 Linear Algebra	This is an NUS course in-lieu of NUSHS Linear Algebra course. This course is a first course in linear algebra. Fundamental concepts of linear algebra will be introduced and investigated in the context of the Euclidean spaces R^n. Proofs of results will be presented in the concrete setting. Students are expected to acquire computational facilities and geometric intuition with regard to vectors and matrices. Some applications will be presented. Major topics: Systems of linear equations, matrices, determinants, Euclidean spaces, linear combinations and linear span, subspaces, linear independence, bases and dimension, rank of a matrix, inner products, eigenvalues and eigenvectors, diagonalization, linear transformations between Euclidean spaces, applications.	4	MA5131, Department Approval	Student can only take MA5431 or MA5431V to fulfil math honours program.		4	In order to fulfil Math Honours, a student must take: 1.MA5431V (4UNIT) and MA6431V (4UNIT), OR 2.MA5431 (2UNIT) and MA6431V (4UNIT) and MA6432/MA6433 (2UNIT), OR 3.MA5431 (2UNIT), MA5432 (2UNIT) and MA6431V (4UNIT) A total of 8 UNIT.
5	2	MA5432	Honours	Polar Coordinates, Parametric Equations and Vector Functions	In this course, students will explore the polar coordinate system. Parametric equations are introduced. Derivatives and integrals of polar, parametric and vector functions will also be taught.	2	MA5131			2	+ Students majoring with Honours in Mathematics must complete at least 8 UNITs of the Honours courses.
6	1	MA6131	Core (Major)	Advanced Statistics	This demanding and rigorous course is a continuation of the previous statistics course. Topics include t-distribution and chi-square distribution. Estimation, test of significance, correlation and linear regression will be revisited at a deeper level. Design of experiments and survey methodology will also be covered.	5	MA5132			5	
6	2	MA6132	Core (Major)	Advanced Math II	This course revisits concepts covered in earlier Advanced Mathematics courses and extends it further. Students will learn to solve 3D vectors problem involving lines and planes. The use of De Moivre's theorem to find the nth roots of a complex number and to prove mathematical results will also be covered. Theory of equations (up to degree 4) and recurrence relations will be taught too.	5	MA4132, MA5131			5	
6	1	MA6431	Honours	Honours Calculus	This demanding and rigorous Honours course exposes students to advanced applications of calculus involving parametric, polar and vector functions as well as polynomial approximations and	2	MA5432			2	+ Students majoring with Honours in Mathematics must complete at least 8 UNITs of the Honours courses.

					convergence of series. Formal definitions of continuity and differentiability are also introduced. This course is more than sufficiently prepared to take the AP Calculus BC examination. Those who are keen may also try for the NUS Advanced Placement Credit Exam in Calculus.						
6	1	MA6431V	Honours in lieu	NUS/MA2002 Calculus	This is an NUS course in-lieu of NUSHS Honours Calculus course. This is a course in single-variable calculus which will introduce precise definitions of limit, continuity, the derivative and the Riemann integral. Students will be exposed to computational techniques and applications of differentiation and integration. This course concludes with an introduction to first order differential equations.	4	MA5131, Department Approval	Student can only take MA6431 or MA6431V to fulfil math honours program.		4	In order to fulfil Math Honours, a student must take: 1.MA5431V (4UNIT) and MA6431V (4UNIT), OR 2.MA5431 (2UNIT) and MA6431V (4UNIT) and MA6432/MA6433 (2UNIT), OR 3.MA5431 (2UNIT), MA5432 (2UNIT) and MA6431V (4UNIT) A total of 8 UNIT.
6	2	MA6432	Honours	Numerical Analysis	This course covers a variety of numerical approaches to find approximate solutions to problems that are not open to the analytical approach. Concepts covered include numerical solutions to linear equations, numerical estimation of definite integrals and solving differential equations numerically.	2	MA6431/MA 6431V			2	+ Students majoring with Honours in Mathematics must complete at least 8 UNITs of the Honours courses. ^Students either take MA6432 or MA6433.
6	2	MA6433	Honours	Graph Theory	Graph Theory is a branch of discrete mathematics which deals with discrete objects and quantities and has wide applications, particularly in computer science and engineering. In this course, students will learn the nature and properties of simple graphs, and different types of graphs such as connected graphs, regular graphs, complete graphs, bipartite graphs and trees. They will also learn the application of graph theory including tournament, matching, and scheduling problems.	2	MA6431/MA 6431V			2	+ Students majoring with Honours in Mathematics must complete at least 8 UNITs of the Honours courses. ^Students either take MA6432 or MA6433.

Computer Science

Infocomm Technology is becoming an integral part of our life in the new global economy. Computing education at NUS High aims to equip students the ability to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design and technology, and provides insights into both natural and artificial systems. Computing also ensures that students become digitally literate (i.e. be able to use, express themselves and develop their ideas through information and communication technology, at a level suitable for the future workplace and as active participants in a digital world).

The Computer Science curriculum in NUS High School is divided into two key stages – Foundation and Specialisation Years.

In the Foundation Years (Year 1 to 3), students are exposed to a breadth of topics in Computing so that they can appreciate what the study of Computer Science is about. In particular, all students will be required to read CS1131 Computational Thinking in Year 1 Semester 2. Computational thinking is taking an approach to solving problems, designing systems and understanding human behaviour that draws on fundamental concepts in computer science. Via this course, students will be exposure to three key areas in Computer Science: 1) Problem Solving, 2) Programming Principles & Concepts and 3) Data Skills.
The courses in the Foundation Years aim to ignite students' interest and passion in Computer Science, and also serve as a foundation for many courses offered in the later years.

In the Specialization Years (Year 4 to 6), students will be exposed to more advanced Computer Science concepts, and relate these ideas to the diverse computing systems and applications in real life.

The Department offers both Major in Computer Science and Major with Honours in Computer Science. To qualify for reading a Major with Honours in Computer Science, students have to achieve consistently excellent results in their Core courses.

The Department follows the general school policies on curriculum and assessment. For more details, please refer to the school curriculum framework.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	2	CS1131	Core	Computational Thinking	Computational thinking is taking an approach to solving problems, designing systems and understanding human behaviour that draws on fundamental concepts in computer science. This course consists of three main units: 1) Problem Solving, 2) Programming Principles & Concepts and 3) Data Skills. Students will be able to 1) Learn and apply a variety of problem-solving techniques to discover a solution to problems that are situated in a variety of contexts. 2) Understand basic programming principles and concepts such as iterations, conditionals and variables using turtle graphics. 3) Perform simple data cleaning, analysis and visualization using various functions in Excel and learn about the importance of data security.	2	None			2	
2	1	CS2231	Elective	Introduction to Programming	This elective will introduce to students basic programming principles and concepts. Students will learn about important programming concepts such as variables, data types, assignment statements and expressions, conditional statements, loops and list. Students who have completed the course would be able to write useful programs to solve problems.	2	CS1131			1.5	
2	2	CS2233	Elective	Problem Solving in Computing	The aim of this course is to introduce students to the discipline of computing and to the problem solving process. Students will apply the programming concepts learnt to solve various problems.	2	CS2231			1.5	
2	2	CS2331	Enrichment	Basic Introduction to Artificial Intelligence	This course will allow students to develop the technical and social skills required in an AI-fueled world through interactive lessons that include games, Python programming activities, group discussions, and presentations. Important concepts such as the AI ethics & privacy will also be covered along with how AI can be used to create positive social impact. Students will be taught no-code tools to AI concepts to establish a strong systems thinking mindset, before working on code.	2	CS2231			1.5	
3	1	CS3231	Elective	Object Oriented Programming I	This course introduces the concepts of Object Oriented Programming (OOP) using Java. Topics include: Introduction to Java and OOP concepts, control flow, use of Java API, the use and design of classes and objects, use of Arrays & ArrayList, simple File IO & Exception handling, and creating Java GUI applications.	3	CS2231			3	# Students majoring in Computer Science (CS) in the Specialisation Years will have CS3231 and CS3233 reflected as CS3131 and CS3132 respectively as these electives will be converted to core courses for the CS Major and will be included in their CS Subject GPA.
3	2	CS3233	Elective	Object Oriented Programming II	This course is the second part of a two-part series on introductory programming from an object-oriented perspective. It continues the introduction to object-oriented programming begun in CS3204, with an emphasis on more advanced concepts in OOP (e.g. inheritance, abstraction, polymorphism). Students will also learn how to create a Graphical User Interface in Java (JavaFX, Graphics, Animation etc).	3	CS3231			3	# Students majoring in Computer Science (CS) in the Specialisation Years will have CS3231 and CS3233 reflected as CS3131 and CS3132 respectively as these electives will be converted to core courses for the CS Major and will be

											included in their CS Subject GPA.
3	2	CS3234	Elective	Informatics Olympiad Training II	This course targets high ability computing students who are keen to prepare themselves rigorously for the National Informatics Olympiad competition. Advanced algorithmic topics such as dynamic programming, graph algorithms, greedy algorithms, trees etc are covered in this course.	2	CS3232		CS3233	1.5	
4	1	CS4131	Core (Major)	Mobile Application Development	This course introduces students to the design and implementation of Android applications for mobile devices. Students will develop an App from scratch, assuming a good knowledge of Java, and learn how to set up Android Studio, work with various Android building blocks (Activities, Services, Broadcast, etc) to create simple user interfaces to make Apps run smoothly. At the end of the course, students will learn skills for creating and deploying Android applications.	4	CS3233			3	
4	2	CS4132	Core (Major)	Data Analytics	This course aims to allow students to understand the foundational skills in data analytics, including preparing and working with data; abstracting and modeling an analytic question; and using tools from statistics, learning and mining to address these questions. Students will study techniques for how to go from raw data to a deeper understanding of the patterns and structures within the data, to support making predictions and decision making.	4	CS4131			3	
4	1	CS4231	Elective	Informatics Olympiad Training III	This course targets high ability computing students who are keen to prepare themselves rigorously for the National Olympiad in Informatics. Advanced data structures such as fenwick tree, segment tree and advanced algorithms such as dynamic programming will be discussed in the course.	2	CS3234			1.5	
5	1	CS5131	Core (Major)	Introduction to Artificial Intelligence	This course aims to introduce techniques to build computers that are capable of exhibiting intelligent behavior. It will cover a wide range of modern Artificial Intelligence topics including search, logic, knowledge representation etc. The course will provide students with an overview of the applications of Artificial Intelligence.	4	CS4132 or CS4133V or CS4134V			3	
5	2	CS5132	Core (Major)	Data Structures and Algorithms	This course aims to introduce students to advanced data structures and algorithms in programming. Topics covered include: uses and implementations of abstraction and encapsulation through classic data structures (lists, stacks, queues, trees), basic algorithmic analysis, graph representation and various graph-search algorithms.	4	CS5131			3	
5	1 or 2	CS5431V	Honours in lieu	NUS/CS1231 Discrete Structures	This course is offered by NUS School of Computing as CS1231. This course introduces mathematical tools required in the study of computer science. Topics include: (1) Logic and proof techniques: propositions, conditionals, quantifications. (2) Relations and Functions: Equivalence relations and partitions. Partially ordered sets. Well-Ordering Principle. Function equality. Boolean/identity/inverse functions. Bijection. (3) Mathematical formulation of data models (linear model, trees, graphs). (4) Counting and Combinatoric: Pigeonhole Principle. Inclusion-Exclusion Principle. Number of relations on a set, number of injections from one finite set to another, Diagonalisation proof: An infinite countable set has an uncountable power set; Algorithmic proof: An infinite set has a countably infinite subset. Subsets of countable sets are countable.	4	CS4133V			4	# Students majoring with Honours in Computer Science and chosen to read Honours Track from NUS School of Computing (SoC) must read at least 2 options.
6	1	CS6131	Core (Major)	Database Design	This course aims to equip students with the fundamental concepts of database design. The course covers data definition and modeling, database access and command languages, and design and implementation in the context of the relational database model.	4	CS5132			3	

6	2	CS6132	Core (Major)	Computer Networking & Security	This course aims to equip students with the fundamental concepts of computer networking. Students will acquire the basic knowledge of data transmission, TCP/IP protocol architecture, local area network technologies, wireless network and concept of network routing and forwarding. It also teaches the basic concepts and principles of information security, and the fundamental approaches to secure computers and networks.	4	CS6131			3	
6	1 or 2	CS6431V	Honours in lieu	NUS/CS2100 Computer Organisation	This course is offered by NUS School of Computing as CS2100. The objective of this course is to familiarise students with the fundamentals of computing devices. Through this course students will understand the basics of data representation, and how the various parts of a computer work, separately and with each other. This allows students to understand the issues in computing devices, and how these issues affect the implementation of solutions. Topics covered include data representation systems, combinational and sequential circuit design techniques, assembly language, processor execution cycles, pipelining, memory hierarchy and input/output systems.	4	CS4133V			4	# Students majoring with Honours in Computer Science and chosen to read Honours Track from NUS School of Computing (SoC) must read at least 2 options.
6	1 or 2	CS6432V	Honours in lieu	NUS/CS2106 Introduction to Operating Systems	This course is offered by NUS School of Computing as CS2106. This course introduces the basic concepts in operating systems and links it with contemporary operating systems (eg. Unix/Linux and Windows). It focuses on OS structuring and architecture, processes, memory management, concurrency and file systems. Topics include kernel architecture, system calls, interrupts, models of processes, process abstraction and services, scheduling, review of physical memory and memory management hardware, kernel memory management, virtual memory and paging, caches, working set, deadlock, mutual exclusion, synchronization mechanisms, data and metadata in file systems, directories and structure, file system abstraction and operations. Examples will be discussed from contemporary operating systems such as Unix/Linux and/or Windows.	4	CS6431V			4	# Students majoring with Honours in Computer Science and chosen to read Honours Track from NUS School of Computing (SoC) must read at least 2 options.

Biology

The Biology Curriculum is uniquely designed to cover both breadth and depth of the subject. Courses adopt a spiral and thematic approach that aims to enable students to build a solid foundation in biology and prepare them for advanced studies of biology and biology related disciplines. In chronological sequence of learning, these courses are Foundations in Biology I, Foundations in Biology II, Foundations in Biology III, Advanced Biology I, Advanced Biology II and Applied Biology.

The first three years are Foundation Years which will introduce students to the basic concepts of the various fields of biology, while allowing them to develop observation and inquiry skills. Besides equipping them with a good foundation, the experiential and hands-on learning will also provide an opportunity for them to pick up good habits of the mind and effective scientific skills. The topics covered include cell biology, human biology, botany, animal physiology, genetics and molecular biology.

The next three years are Specialization Years whereby students who are interested in pursuing biology related disciplines in universities will continue their learning in biology beyond the basics. The topics covered include evolutionary biology, ecology, biodiversity, molecular genetics and biochemistry. Students will explore biological phenomena, learn more extensively via outdoor field trips and engage in more in-depth investigations. There is more exposure to critical thinking and analytical skills in the more demanding courses, as well as an emphasis towards more knowledge application in broader and concept-orientated perspectives. Students will also become more independent in their learning approaches.

The Department offers both Major in Biology and Major with Honours in Biology. To qualify for reading a Major with Honours in Biology, students have to achieve consistently good results in Core Courses.

Students will have the option of sitting for the AP Biology examination in Year 6.

The Department follows the general school policies on curriculum and assessment. For more details, please refer to the school curriculum framework.

The Department does not practice exemption and acceleration of courses. Students who may have advanced knowledge in certain topics in biology will still be expected to go through the courses to attain hands-on experience in the laboratory and in the field, which unlike theoretical knowledge, cannot be acquired from textbooks.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 and 2	BL1131	Core	Foundations in Biology I	This is a year-long course that aims to develop students' theoretical and practical competencies in biology, so that they will build a strong foundation, encompassing both breadth and depth, on which to further their studies in biology via the NUS High curriculum. The course begins with a macro perspective of life by getting students to explore how biotic and abiotic factors may influence the diversity and distribution of organisms, and discuss ethical issues related to the environment. Next, students will zoom into the study of the building blocks of life – cells. In order to support life, movement of biological molecules into and out of cells must occur – therefore mechanisms through which this can be facilitated are also subsequently studied. The biological molecules that move in and out of cells are also studied in detail; and students will also carry out investigations regarding how these substances can be identified. Lastly, students will explore the fate of biological molecules in plant systems with regards to nutrition. Three biological themes are addressed at various points during the course: the correlation between structure and function, the relation between a system and its parts, as well as the flow of energy through biological units. The discussion of bioethical issues is also infused at appropriate points. At the end of the course, it is hoped that students will be inspired to develop a passion for biology through acquiring a deep understanding of the concepts taught and awareness of their applications to daily life, through frequent hands-on activities designed to develop practical skills in a scaffolded manner, as well as through excursions and discussions.	4	None			2	Year long course
1	2	BL1231	Elective	Applied Cell Biology	This course expands on the foundation knowledge that students have acquired in their core course in Semester 2 which focuses on Cell Biology. For this course, students will learn about the need for a hierarchical classification of living organisms. Detailed knowledge and hands-on practicals for Bacteria and Protists will be covered. Examples of commonly encountered during daily life will be highlighted in class. Lab practicals and live specimens will help students reinforce the knowledge acquired in class.	2	Department Approval			1.5	First introduced in 2019 Sem 2; to be continued for subsequent years/graduating classes
2	1 and 2	BL2131	Core	Foundations in Biology II	This year-long course will continue to equip students with the basic foundational knowledge required to learn biology at a more advanced level subsequently. The main topics that are covered in this course include transport and reproduction in flowering plants and humans, as well as respiration, excretion and homeostasis in humans. Where appropriate, various bioethical issues and laboratory experimentation will be covered at suitable junctures throughout the course. Laboratory practical sessions will serve to enhance students' learning and understanding.	6	BL1131			3	Year long course
2	1	BL2231	Elective	Biology Olympiad Training I	This course is designed for selected Year 2 students with excellent performance in biology courses. These students will explore some challenging concepts not taught in the core courses. Students can expect rigorous training in a wide range of biology topics as well as answering techniques. Students will be encouraged to take part in various biology competitions where appropriate. This course is by invitation only.	2	Department Approval			1.5	
2	2	BL2232	Elective	Biology Olympiad Training II	This course is for students who have done well for BL2231. It is also open to Year 2 students whose Semester 1 performance in BL2131 is consistently excellent. These students will continue to explore some challenging concepts not taught in the core courses. Students can expect rigorous training in a wide range of biology topics as well as answering techniques. Students will be encouraged to take part	2	Department Approval			1.5	

					in various biology competitions when appropriate. This course is by invitation only.						
2	1 and 2	BL2331	Enrichment	Introduction to Food Science	This course expands on the foundation knowledge that students have acquired in BL1131, as nutrition and food science are intimately related in various aspects. This course will allow students to learn the scientific principles underlying how food is produced, processed, prepared and evaluated. The concepts taught will be illustrated through a series of hands-on experiments involving food preparation and food evaluation, which can enhance students' understanding and appreciation of the concepts in an experiential manner.	2	BL1131			1.5	
3	1 and 2	BL3131	Core	Foundations in Biology III	After acquiring the basic foundational knowledge in biology in Year 1 and 2, students will move on to learn about the human nervous, sensory, endocrine and excretory systems. In addition, how cell divides by mitosis and meiosis will also be covered before students learn about the concepts of inheritance and genetic variation. For the section on molecular genetics, the structure of DNA and its role in protein synthesis, genes, genetic engineering and medical biotechnology will be covered. The last part of the course focuses on in-depth study of the cell and molecules of life. It includes the functions of membrane systems and organelles in cells, the structures of biomolecules and their functions, as well as infectious diseases in humans. Where appropriate, various bioethical issues and laboratory experimentation will be covered at suitable junctures throughout the course.	6	BL2131			3	Year long course
3	1	BL3231	Elective	Biology Olympiad Training III	This course is designed for students who like to challenge themselves with the difficult concepts in biology. They will learn additional topics and explore the concepts beyond what they have covered in their Year 3 core biology course in greater depth. It also prepares them for the UK Biology Challenge that is opened to all students who are 13 to 15 years old, as well as the Singapore Junior Biology Olympia (SJBO) that is opened to Year 2 to 4 students. This course is by invitation only.	2	Department Approval			1.5	
3	2	BL3232	Elective	Biology Olympiad Training IV	This course is for students who have done well in BL3231. It is also open to Year 3 students whose Semester 1 performance in BL3131 is consistently excellent. These students will explore some challenging concepts not taught in the core courses. Students can expect rigorous training in biology topics that will prepare them for the following year's biology competitions. This course is by invitation only.	2	Department Approval			1.5	
3	1	BL3331	Enrichment	Foundations In General Biology	This is a bridging course offered to the yearly intake of new Year 3 students. Students will be equipped with foundational knowledge from core content such as ecology, basic cell biology, and basic physiology through lectures. In addition, a key emphasis in the second half of the course will be the development and familiarization of hands-on biological skills that will equip students in studying biology in their senior high years. Laboratory skills involving microscopy, microbiology and physiology techniques will be taught.	2	None			1.5	Bridging course (For new Yr 3 intake only)
4	1 and 2	BL4131	Core (Major)	Advanced Biology I	Based on the foundation that students have built in the lower years, this course will explore various biological topics in greater depth. The topics covered include mode of action of enzymes, eukaryotic chromatin, genome organization, control of gene expression, mutations, cancer biology, energy and equilibrium, as well as biological evolution. Where appropriate, various bioethical issues and laboratory experimentation will be covered at suitable junctures throughout the course.	8	BL3131			4	Year long course
4	1	BL4231	Elective	Biology Olympiad Training V	This course is designed for selected Year 4 students with consistently excellent performance in their previous years' biology courses. They will be trained for the Singapore Junior Biology Olympiad (SJBO). Students can expect rigorous training in topics that are not taught in the core courses. This course is by invitation only.	2	Department Approval			1.5	

4	2	BL4232	Elective	Biology Olympiad Training VI	This course is for students who have done well for BL4231 or those whose Semester 1 performance in BL4131 is consistently excellent. Students will be rigorously trained in topics of biology that are not covered in the core courses. The training is an important preparation for the Singapore Biology Olympiad (SBO) in the following year. This course is by invitation only.	2	Department Approval			1.5	
5	1 and 2	BL5131	Core (Major)	Advanced Biology II	This course builds on what students have learnt from BL4131, Advanced Biology I. Students will deepen their understanding of various advanced level biological topics which they will be exploring in a rigorous manner. The course deepens students' understanding of the following fields: ecology, physiology, genetics, and cytology. Students' knowledge of biochemistry, evolution and biodiversity is also strengthened and broadened through the infusion of concepts and ideas from these fields throughout the course. Focus is deliberately placed on the applications of concepts learnt within the course to issues encountered in daily life or at the national and global level, which involves the consideration of other disciplines. Besides cross-disciplinary links, the course focuses on drawing links between the different fields of biology. The course covers an ecology curriculum that is unique to NUS High School. It also covers infectious diseases, DNA technology, and neuronal signalling. Through the course, the big idea of evolutionary pressures and the trade-offs between different evolutionary strategies, across the different topics, is emphasised. Where appropriate, various bioethical issues will also be explored. Besides field work, students will also be given the opportunity to experience the following in a hands-on manner: running statistical simulations and analyses using ICT tools, simulating intra-specific and inter-specific competition, carrying out gene cloning, using ELISA to diagnose HIV, and measuring the effect of neuromodulators on action potentials generated in the nervous system of a cricket.	8	BL4131			4	Year long course
5	1	BL5231	Elective	Biology Olympiad Training VII	This course is designed for selected students with consistently excellent performance in their previous years' biology courses. They will be trained for the Singapore Biology Olympiad (SBO). Students can expect rigorous training in a wide range of biology topics as well as answering techniques. This course is by invitation only.	2	Department Approval			1.5	
5	2	BL5232	Elective	Biology Olympiad Training VIII	This course is for students who have done well for BL5231 or those who are invited to read it due to their consistently excellent performance in their Year 5 biology courses. They will go through rigorous preparation for Singapore Biology Olympiad (SBO), which will be held in November (Theory Round) and December (Practical Round). A final selection of students to represent the school in SBO will be made at the end of this course.	2	Department Approval			1.5	
5	1	BL5431	Honours	Advanced Biology III	This course provides an exciting platform for the study of invertebrate animal diversity. It gives a brief introduction to the science behind classification by learning about taxonomy and phylogeny. Students will learn about the different invertebrate taxa, with an emphasis on diagnostic characteristics, evolutionary relationships, functional adaptations and environmental interactions. The interdisciplinary nature of this course aims to develop in students a deeper understanding and appreciation of the evolutionary innovations in the animal kingdom. Laboratory practicals conducted in this course will allow students to examine specimens in details. Field trips will also be organised for students to learn about taxonomical work and the natural heritage of Singapore.	2	BL4131			2	
5	2	BL5432	Honours	Advanced Biology IV	This course focuses on vertebrate organisms and is a continuation of the previous course which focuses on invertebrates. Students will learn about the different vertebrate taxa, with an emphasis on diagnostic characteristics, evolutionary	2	BL4131			2	

					relationships, functional adaptations and environmental interactions. The interdisciplinary nature of this course allows students to develop a deep understanding and appreciation of the evolutionary innovations in the animal kingdom. Laboratory practicals and relevant field trips will conducted for students to learn about taxonomical work and the natural heritage of Singapore.						
5	2	BL5434V	Honours in lieu	NUS/LSM2107 Evolutionary Biology	Evolutionary biology covers the history of life on our planet and the processes that produced the multiple life forms of Earth. Topics include: the origins of life, the eukaryotic cell, and multicellularity; the generation of genetic variation and the sorting of that variation through random processes and through natural and sexual selection; the origin of new traits, new life histories, and new species; the origins of sex, sociality, and altruism; the evolution of humans; and applications of evolutionary biology to solving modern-day problems.	4	BL4131			4	LSM2107 has a quota of 5 students per semester that is set by NUS
6	1 and 2	BL6131	Core (Major)	Applied Biology	After acquiring advanced-level knowledge in biology from previous courses, this course enables students to appreciate the application aspects of biology. The emphasis on current trends in biology and relevant contemporary issues will give students the opportunity to understand the significance of what they are learning and how knowledge and technology could be harnessed to tackle real life problems. The topics covered include bioethics, the impact of climate change on plants and animals, as well as microbiology and its environmental applications.	8	BL4131 and BL5131			4	Year long course
6	1	BL6431	Honours	Advanced Molecular Genetics I	This course builds upon students' foundational understanding of molecular genetics and its practical applications. It explores essential topics, including forward and reverse genetics, tools for studying gene expression, recombinant protein production, and protein-protein interactions. In the laboratory, students will conduct hands-on experiments, such as RNA extraction, reverse transcription PCR, gel electrophoresis, gel extraction, TA cloning, bacterial transformation, and blue-white selection, cultivating valuable proficiencies in molecular biology and genetics research. These skills are not only beneficial for future studies but also serve as a solid foundation for pursuing careers in biotechnology, biomedicine, and related fields.	2	BL4131 and BL5131			2	
6	2	BL6432	Honours	Advanced Molecular Genetics II	This course builds upon students' foundational knowledge of molecular genetics and its practical applications, with a specific emphasis on the interplay between protein structure and function. It underscores the importance of comprehending the chemical properties of proteins when selecting appropriate and efficient laboratory methods for tasks such as protein extraction, detection, purification, and quantification. Students will gain a deep understanding of the core principles underpinning these laboratory techniques and how they are applied to protein studies. These studies act as a vital link between basic research and clinical medicine, offering valuable insights into diseases, aiding drug development, facilitating early diagnosis, and enabling personalized treatments.	2	BL4131 and BL5131			2	
6	1	BL6435V	Honours in lieu	NUS/LSM2106 Fundamental Biochemistry	The objective is to provide the student with a firm and rigorous foundation in current concepts of the structure and functions of biomolecules in molecular cellular biology. These fundamental concepts form the basis of almost all recent advances in biological and the biomedical sciences. The lectures will introduce various cellular organelles as models to gain insights into how structures and functions of classes of biomolecules participating in important cellular processes.	4	BL4131			4	LSM2106 has a quota of 5 students per semester that is set by NUS

6	1	BL6436V	Honours in lieu	NUS/LSM2105 Molecular Genetics	This course covers topics on (i) the patterns of inheritance, (ii) the molecular properties of genes and chromosomes, (iii) transcription and translation, (iv) genetic methods and technology, and (v) genetic analysis of individuals and populations. This will include an in-depth understanding of mendelian patterns of inheritance and variations that could occur due to multiple alleles, lethal genes, chromosomal variations, linkage, gene interaction and other genetic phenomena. Emphasis is placed on the understanding of the underlying molecular and biochemical basis of inheritance. Quantitative and population genetics will also be discussed with the emphasis of understanding the processes and forces in nature that promote genetic changes.	4	BL4131			4	LSM2105 has a quota of 5 students per semester that is set by NUS

Chemistry

The Chemistry curriculum in NUS High School of Mathematics and Science is a 6-year course which aims to deliver a meaningful learning experience for every student, and seeks to nurture the student as an inquirer. It is designed to ultimately instil depth in the understanding of fundamentals, and high competency in solving chemical problems. Our exciting curriculum takes on a spiral approach and is divided into two key stages – Foundation and Specialisation.

The objectives of the Foundation Years (Years 1, 2 and 3) are to build a strong understanding in basic and essential concepts in Chemistry and to develop a sense of appreciation for the subject and how closely it relates to our surroundings. The topics introduced will cover a wide breadth, using a conceptual approach, with an emphasis on understanding the behaviour of our physical world from the perspective of atoms and molecules. In addition, students will be frequently engaged in laboratory activities and during the course of which, learn the process of scientific investigations and basic laboratory skills.

In the Specialisation Years (Years 4, 5 and 6), students will be introduced to more advanced concepts. Many of these concepts build on what the students already understand from the Foundation Years and the topics are treated in a more in-depth manner. Courses also incorporate higher order questions to stimulate the analytical minds of the students. At the same time, laboratory work is more intensive as students are now more ready to take on independent research to complement the theory covered in class.

Students will have the option of sitting for the AP Chemistry examination in Year 6.

The Department offers Chemistry Major with Honours for students who have an aptitude and interest in this subject. To qualify, students have to achieve consistently excellent results in the Core courses.

The Department follows the general school policies on curriculum and assessment. For more details, please refer to the school curriculum framework.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 and 2	CM1131	Core	Foundations in Chemistry I	This is a year-long course that is designed to introduce students to basic ideas and principles in Chemistry and places emphasis on understanding and application of scientific concepts. Topics covered include experimental chemistry, kinetic theory of matter, acid-base reactions, as well as chemical bonding, formulae and equations. As Chemistry is an experimental science, students will have numerous opportunities to handle basic laboratory apparatus during the practical sessions. The knowledge and skills introduced in this course are essential to the understanding of Chemistry in the more advanced courses.	4	None			2	Year long course
1	1 and 2	CM1331	Enrichment	Chemical Potpourri I	This lab-based course covers a series of chemical investigations ranging over several areas of Chemistry. Students can look forward to activities which complement the formal study of Chemistry in the classroom and provide opportunities for developing analytical skills in dealing with chemical problems.	2	None			1.5	
2	1 and 2	CM2131	Core	Foundations in Chemistry II	This year-long course is a continuation from Foundations in Chemistry I, and aims to strengthen the fundamental chemistry concepts required for chemistry students to appreciate and master the chemistry courses taught at higher levels. The emphasis in this course is to enable students to apply their foundational knowledge of the various aspects of chemistry in understanding chemical reactions including precipitation, acid-base and redox reactions. Emphasis will also be given to practical skills required for the volumetric and qualitative analysis of chemicals.	6	CM1131			3	Year long course
2	2	CM2231	Elective	Chemistry Olympiad Training I	This introductory course serves to engage talented students with a more in-depth study of the concepts learnt in Year 1 and 2 core courses, with the incorporation of some new concepts. It also serves to train the students' problem-solving ability and nurture their scientific common sense.	2	Department Approval			1.5	
2	1 or 2	CM2331	Enrichment	Chemical Potpourri II	Chemistry plays an integral role in the daily running of our lives. This course aims to continue to give students insight and appreciation of the chemistry that affects our daily activities through chemical investigations that range over several areas of Chemistry, such as the food we eat and the soaps we use.	2	CM1131			1.5	
3	1 and 2	CM3131	Core	Foundations in Chemistry III	This course extends the concepts covered in the first two foundation courses. It will introduce students to the fascinating world of Organic Chemistry and also delve a little deeper into Chemical Bonding. Other topics covered include Energy Changes and Redox Reactions. Concluding this course, students will consolidate what they have learnt in the foundation years.	6	CM2131			3	Year long course
3	1	CM3231	Elective	Chemistry Olympiad Training II	This course serves to engage talented students in chemistry with a more in-depth study of topics learnt in Years 1-3 core courses. New concepts will be included and many are built on the key understanding of the concepts acquired previously. This course also aims to train the students' problem solving ability and nurture their scientific skills to get them better prepared for the Olympiad competitions.	2	Department Approval			1.5	
3	2	CM3232	Elective	Chemistry Olympiad Training III	This course serves to engage talented students in chemistry with a more in-depth study of topics learnt in Years 1-3 core courses. New	2	Department Approval			1.5	

					concepts will be included and many are built on the key understanding of the concepts acquired previously. This course also aims to train the students' problem solving ability and nurture their scientific skills to get them better prepared for the Olympiad competitions.						
3	1	CM3332	Enrichment	Foundations in Chemistry (Bridging)	This is a bridging course for new students joining our school at Year 3. It aims to allow students to master fundamental chemistry knowledge which will be required for the understanding of higher chemistry courses. There will also be hands-on experience in volumetric analysis and basic chemical analysis.	2	Department Approval			1.5	Bridging course (For new Yr 3 intake only)
4	1	CM4131	Core (Major)	Principles of Inorganic Chemistry and Structure of Matter	The course introduces the basic ideas of Quantum Theory, describes the electronic structures of the elements in the Periodic Table and explains the periodicity of the atomic properties of the elements. It continues with the Valence Bond Theory and the concept of hybridisation in describing the formation of covalent bonds. Structures and properties of gases, liquids and solutions are then examined in greater detail. The course concludes with the principles of Inorganic Chemistry, focusing on the key ideas such as the Uniqueness Principle, the Diagonal Effect, the Inert-pair effect, Lewis acid/base, pπ-dπ bonding and the acid-base nature of oxides.	4	CM3131			4	
4	2	CM4132	Core (Major)	Chemical Kinetics and Equilibria	Chemical Kinetics is the study of rates of chemical reactions. The course introduces the Collision theory to explain how various factors affect rates of reactions. It also covers in depth the quantitative description of reaction kinetics, followed by proposing reaction mechanisms that are consistent with experimental rate laws. The concept of Equilibrium is fundamental in almost all chemical reactions, as well as many physical processes. This course explores the idea of reversible reactions, dynamic equilibrium in a closed chemical system, and how various factors can influence an equilibrium system. With this understanding, we will be able to describe chemical equilibrium quantitatively using equilibrium constants. The course also deals with various homogeneous and heterogeneous equilibria in depth, ranging from gaseous equilibria to aqueous equilibria of weak acids and bases, buffer solutions and sparingly soluble salts.	4	CM4131			4	
4	1	CM4231	Elective	Chemistry Olympiad Training IV	These are chemistry elective courses specially designed for Year 4 students who have done very well in chemistry and show potential in handling more challenging content and tackling harder physical chemistry problems.	2	Department Approval			1.5	
4	2	CM4232	Elective	Chemistry Olympiad Training V	These are chemistry elective courses specially designed for Year 4 students who have done very well in chemistry and show potential in handling more challenging content and tackling harder physical chemistry problems.	2	Department Approval			1.5	
5	1	CM5131	Core (Major)	Organic Chemistry	Organic chemistry has been the frontier of chemical research. It surrounds us in every part of our life and its knowledge transcends all disciplines of science. The vast majority of chemical compounds known to man are organic; that is, they are compounds built on a carbon framework. Organic compounds vary greatly in size and complexity, from the simplest hydrocarbon, methane, to macromolecules, made up of thousands of atoms. This course builds	4	CM4131 and CM4132			4	

					on the foundation from Year 3 and students can expect to learn more oragnic reactions and delve deeper into the mechanisms.						
5	2	CM5132	Core (Major)	Thermodynamics and Electrochemistry	Chemical Thermodynamics is the study of the interrelation of heat and work with chemical reactions. The course makes use of the First Law of Thermodynamics to establish an understanding of enthalpy change of reaction and focuses on the measurements of enthalpy changes by calorimetry, and the calculations of enthalpy changes by the Hess' Law. The course further makes use of the Second Law of Thermodynamics, focusing on the use of Gibbs free energy change, to predict and explain the spontaneity of a reaction under a specific set of conditions. The Third Law of Thermodynamics is also discussed in order to have a complete understanding of entropy changes of reactions. Building upon the redox as well as reactivity concepts covered in the foundation years, this course will delve deeper into electrochemistry, covering the principles underlying the function of galvanic cells and the selective discharge of ions in electrolytic cells.	4	CM4131 and CM4132			4	
5	1	CM5231	Elective	Chemistry Olympiad Training VI	These are chemistry elective courses specially designed for Year 5 students who have done very well in chemistry and display a strong passion for the subject. During the course, students must show potential in handling more challenging content and tackling higher order chemistry problems. Students who exhibit high level of understanding and competence may eventually be shortlisted for the Singapore Chemistry Olympiad (SChO).	2	Department Approval			1.5	
5	2	CM5232	Elective	Chemistry Olympiad Training VII	These are chemistry elective courses specially designed for Year 5 students who have done very well in chemistry and display a strong passion for the subject. During the course, students must show potential in handling more challenging content and tackling higher order chemistry problems. Students who exhibit high level of understanding and competence may eventually be shortlisted for the Singapore Chemistry Olympiad (SChO).	2	Department Approval			1.5	
5	1	CM5431	Honours	Separation Science	This course covers the various aspects of separation techniques used in modern day chemistry. Students will gain an understanding of distillation, extraction, and various chromatographic methods, including Thin Layer Chromatography (TLC), gas chromatography (GC), ion-exchange chromatography and high performance liquid chromatography (HPLC). Students will also gain practical experience into these topics.	2	CM4131 and CM4132			2	
5	2	CM5432	Honours Option	Structural Elucidation	This course covers the different approaches and methods that are employed by scientists in modern day chemistry to deduce the structural features of unknown compounds. Some of the characterization techniques covered will include nuclear magnetic resonance (NMR) spectroscopy, mass spectrometry (MS), and infrared (IR) spectroscopy. These analytical skills will aid them greatly in their pursuit, particularly in Science and Engineering.	2	CM5131			2	
5	2	CM5433	Honours Option	Principles of Chemical Engineering	This course provides students with a basic concept of chemical engineering processes and related problem-solving methods. It provides an introduction to the principles of chemical engineering process analysis. The course discusses details of steady state material and energy balances, including recycles, bypass, purge,	2	CM5131			2	

					phase change and chemical reactions. Other topics include simultaneous mass and energy balances. Students taking this course must have a strong foundation in mathematics.						
5	2	CM5436V	Honours in lieu	NUS/CM1102 Chemistry - The Central Science	The course takes on a thematic approach to illustrate core concepts and the central role it plays in science. The three main themes are – the Environment, Materials and Life. Issues such as global warming, industrialization, energy, sustainability, biomedical advancement, etc. will be discussed. Students will get to appreciate key scientific fundamentals, explore real issues and deliberate on possible future solutions.	4	CM5131 and Department Approval			4	
6	1	CM5436V	Honours in lieu	NUS/CM1102 Chemistry - The Central Science	The course takes on a thematic approach to illustrate core concepts and the central role it plays in science. The three main themes are – the Environment, Materials and Life. Issues such as global warming, industrialization, energy, sustainability, biomedical advancement, etc. will be discussed. Students will get to appreciate key scientific fundamentals, explore real issues and deliberate on possible future solutions.	4	CM5131 and Department Approval			4	Re-offered by NUS this semester. Catered to students on the NUSH hybrid track
6	1	CM6131	Core (Major)	Chemistry in Context	This course aims to allow students to explore various commonly encountered contexts where chemistry is applied in areas of industry, research, pharmaceuticals, forensics as examples. Over the course of the course, key cornerstone chemical concepts – the big ideas, the enduring understanding and essential knowledge in chemistry will be revisited and consolidated.	4	CM5131 and CM5132			4	
6	2	CM6132	Core (Major)	Experiments in Synthetic Chemistry	This course provides an introductory experience in laboratory synthesis and analytical techniques. Chemical synthesis is one of the most valuable skills to learn in a chemistry laboratory and these practical sessions are designed to provide a thorough training in elementary techniques commonly employed in synthetic chemistry. Analytical techniques such as chromatography will also be featured in this highly intensive laboratory course.	4	CM5131 and CM5132			4	
6	2	CM6431	Honours	Emerging Trends in Chemistry	This course aims to equip students with an understanding of the current and emerging issues that affect us and how chemistry is linked to these issues. These include organocatalysis, graphene chemistry, organic chemistry, environmental chemistry, nanochemistry, medicinal chemistry and inorganic chemistry. Guest speakers will be invited to discuss their current research, and the latest technology and developments in Chemistry.	2	CM5131 and CM5132			2	
6	2	CM6432	Honours Option	Advanced Organic Chemistry	Organic chemistry surrounds us in every part of our life and its knowledge transcends all disciplines of science. The vast majority of chemical compounds known to man are organic; that is, they are compounds built on a carbon framework. Organic compounds vary greatly in size and complexity, from the simplest hydrocarbon, methane, to macromolecules, made up of thousands of atoms. In this advanced course, students will go more in depth and scope of the types of reactions they have learnt in the previous organic chemistry course.	2	CM5131			2	
6	2	CM6433	Honours Option	Quantum Chemistry and its Applications	This course aims to provide students with the understanding of the physical and mathematical aspects of quantum chemistry and molecular electronic structure. Areas to be covered include history and development, basic principles and Schrodinger equation,	2	CM5131 and CM5132			2	

					common approximations and molecular geometry predictions. A strong foundation in mathematics is important for this course.						
6	1	CM6436V	Honours in lieu	NUS/CM2133 Foundations of Physical Chemistry	Students will learn how the wavefunction description of matter leads to energy quantization. This concept is applied to spectroscopic techniques of UV-visible, FTIR, Raman and NMR spectroscopy. The laws of thermodynamics that characterize and govern physical chemical systems will also be included and applied to phase and chemical equilibria. In chemical kinetics, the rate laws, reaction mechanisms and simple rate theories will be discussed.	4	NUS CM1102 and Department Approval			4	

Physics

The Physics & Engineering curriculum in NUS High School spans 6 years and is divided into two key stages – Foundation and Specialisation Years.

Foundation courses (Year 1, 2 & 3) are designed to ensure that students receive a strong grounding in fundamental Physics concepts such as motion, conservation of energy and electricity. There is a greater emphasis on hands-on activities to enable students to develop a conceptual understanding of these concepts.

The Specialisation courses (Year 4, 5 & 6) build on what has been introduced in the earlier years, covering a wide range of topics from rotational mechanics to practical circuitry and modern physics. Honours students will extend their study in mechanics and electromagnetism through the use of calculus as well as offer a course on special relativity. The emphasis is on deepening students' understanding and extending their learning through a higher level of analytical and mathematical sophistication. These courses provide the necessary foundation for students to take university courses in Physics and Engineering.

Besides the core courses, the department offers an excellent variety of elective & enrichment courses, which are intended to cater to students' varied interests and passions in Physics. Examples of these areas include robotics and astronomy.

Besides Major in Physics, the department also offers both Major with Honours in Physics and Major with Honours in Engineering. A summary of the required courses is given in the table below. All students are strongly encouraged to keep Physics as a major regardless of their field of specialisation in university. All Physics students will have the option of sitting for the AP Physics 1 examination in Year 5. Students offering Major with Honours in Physics will have the option of sitting for the AP Physics C examinations in Year 6.

The Department follows the general school policies on curriculum and assessment. For more details, please refer to the school curriculum framework.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 and 2	PC1131	Core	Foundations in Physics I	This course provides an introduction to some foundational topics in Physics. These include Physical Quantities, Units & Measurement, Mass, Weight & Density, General Wave Properties, Sound, Light and the Electromagnetic Spectrum.	4	None			2	Year long course
1	1	PC1331	Enrichment	Robotics I	This course aims to spark the interest of students in the field of robotics and artificial intelligence through the use of animatronics and applied A.I resources. They will learn how to use engines and libraries to generate poems and/or lyrics, where they will then program their robot heads to mouth the words in a realistic manner. The course is conducted by an external vendor and the total cost per student is S$100. For Singaporean students, Edusave Fund may be used for this payment.	2	None			1.5	This course is offered subject to teaching manpower availability
1	2	PC1332	Enrichment	Robotics II	This course is a hands-on introduction to robotics through the mechanical building and control of a tracked vehicle and a turret. Students will learn to integrate modular electronics and sensor technology with the Raspberry Pi Pico microcontroller, while controlling the mobile vehicle from the PC using the python programming language. The workshop culminates with a mini friendly competition on the final lesson based on a set course and terrain. The course is conducted by an external vendor and a course fee is applicable. For Singaporean students, Edusave Fund may be used for this payment.	2	None			1.5	This course is offered subject to teaching manpower availability
1	2	PC1333	Enrichment	Introductory Astronomy	This course provides an introduction to some introductory topics in astronomy. These include the structure of the universe, models of the solar system, the celestial sphere and tools of astronomy, including telescopes & charge-coupled devices.	2	None			1.5	This course is offered subject to teaching manpower availability
2	1 and 2	PC2131	Core	Foundations in Physics II	This course provides an introduction to some foundational topics in Physics. These include Kinematics, Dynamics, Work, Energy, Power, Pressure, Kinetic Model of Matter, Thermal Physics, and Internal Energy.	6	PC1131			3	Year long course
2	2	PC2231	Elective	Physics Olympiad Training I	This course covers challenging problems in physics and can be taken as preparation for the Singapore Junior Physics Olympiad (SJPO).	2	None			1.5	
2	1	PC2331	Enrichment	Robotics III	This course is a hands on introduction to electronics, electronic prototyping, mechanical building with digital servo motors, and inverse kinematics with a 3-DOF robotic arm. Students will learn to control their robotic arm for a variety of applications and tasks including picking things up and drawing. The course is conducted by an external vendor and the total cost per student is S$100. For Singaporean students, Edusave Fund may be used for this payment.	2	None			1.5	This course is offered subject to teaching manpower availability
2	2	PC2332	Enrichment	Robotics IV	This course aims to introduce students to retro game programming on a handheld retro game console. They will learn to program their own game using the retroPy game engine and micro python. Games will be run on a handheld game console running Raspberry Pi's micro-controller that they will design and build. The course culminates in a mini game competition. The course is conducted by an external vendor and a course fee is applicable. For Singaporean students, Edusave Fund may be used for this payment.	2	None			1.5	This course is offered subject to teaching manpower availability
2	1	PC2333	Enrichment	Astronomy I	This course provides an introduction to further topics in astronomy. These include stars (including Herzspring-Russell diagrams), the evolution of stars, galaxies and cosmology.	2	None			1.5	This course is offered subject to teaching manpower availability

3	1 and 2	PC3131	Core	Foundations in Physics III	This course provides an introduction to some foundational topics in Physics in Electricity and Magnetism. This course also develops concepts in Mechanics. Students will study topics of forces, dynamics, torque and equilibrium, and work, energy and power in greater detail.	6	PC2131			3	Year long course
3	1	PC3231	Elective	Physics Olympiad Training II	This course covers challenging problems in physics and can be taken as preparation for the Singapore Junior Physics Olympiad (SJPO).	2	PC2231			1.5	
3	2	PC3232	Elective	Physics Olympiad Training III	This course covers challenging problems in physics and can be taken as preparation for the Singapore Junior Physics Olympiad (SJPO).	2	PC3231			1.5	
3	2	PC3331	Enrichment	Astronomy II	This course provides an introduction to further topics in astronomy These include the sun, the solar system and other planetary systems.	2	None			1.5	This course is offered subject to teaching manpower availability
3	1	PC3333	Enrichment	Physics Bridging	This course revisits the topics taught in Year 1 and Year 2 and is targeted at students who join the school in Year 3.	2	None			1.5	Bridging course (For new Yr 3 intake only)
4	1	PC4131	Core (Major)	Advanced Physics I	This course provides an introduction to some advanced topics in physics. These include Circular Motion, Momentum, Impulse & Collisions, Oscillations and Gravitation	4	PC3131			4	
4	2	PC4132	Core (Major)	Advanced Physics II	This course provides an introduction to some advanced topics in E&M Physics. These include Electrostatics, Electric Fields & Interactions, Capacitance & Dielectrics, Direct Current Circuits, Electromagnetism, Electromagnetic Induction, and Alternating Currents.	4	PC3131			4	
4	1	PC4231	Elective	Physics Olympiad Training IV	This course covers challenging problems in physics and can be taken as preparation for the Singapore Junior Physics Olympiad (SJPO).	2	PC3232			1.5	
4	2	PC4232	Elective	Physics Olympiad Training V	This course covers challenging problems in physics and can be taken as preparation for the Singapore Physics Olympiad (SPhO).	2	PC4231			1.5	
4	1	PC4331	Enrichment	Astronomy III	This course covers challenging topics in Astronomy and can be taken as a preparation for Singapore Astronomy Olympiad	2	None			1.5	This course is offered subject to teaching manpower availability
4	1	PC4332	Enrichment	Real to Reel: Explaining Physics Though Videos	This course introduces students to the basics of creating Physics explainer videos by combining the science of Physics with the art of video-making.	2	None			1.5	This course is offered subject to teaching manpower availability
5	2	EG5430V	Honours in lieu	NUS/BN1111 Biomedical Engineering Principles and Practice I	Engineering Principles and Practice I (EPP I) is the first in a pair of courses designed to introduce first year students to a biomedical engineer's way of thinking and addressing problems through exposure to real-life medical technologies. These technologies will be used to demonstrate the fundamental knowledge and skills a biomedical engineer is expected to possess. In this course, students will be exposed to key engineering problems such as how to analyse a complex medical device, along with how to conceptualise, represent and present their such devices.	4	PC4131 and PC4132			4	
5	2	EG5431V	Honours in lieu	NUS/CN1101A Chemical Engineering Principles and Practice I	This course provides an experiential exposure to chemical engineering concepts through a series of hands-on experimental laboratories. Simple yet visually engaging demonstrations will bring these concepts to life, and act as a preview and bridge to the core courses in the undergraduate curriculum, while highlighting their practical relevance. The students will prepare for each session by compulsory pre-laboratory readings on theoretical background and laboratory procedures. In the laboratory, they will learn to carry out measurement, data collection, analysis, modelling, interpretation and presentation. The laboratory sessions will be blended with real engineering applications of industrial and societal relevance to Singapore.	4	PC4131 and PC4132			4	

5	2	EG5432V	Honours in lieu	NUS/CE1103 Principles of Structural and Geotechnical Engineering	This course aims to stoke the curiosity and passion of engineering students to the wonders of Civil Engineering. From iconic landmark structures such as horizontal longspan bridges and vertical skyscrapers, to massive underground MRT interchanges and complex intertwining subway tunnels, these structures must withstand both the forces of nature and those that mankind has intended for them. This course introduces the engineering fundamentals behind the design and construction of such man-made marvels. Through learning the basic concepts of structural and geotechnical engineering, students will gain an appreciation of the key principles governing the equilibrium and stability of these complex structures.	4	PC4131 and PC4132			4	
5	2	EG5433V	Honours in lieu	NUS/CG1111A Engineering Principles and Practice I	This course aims to equip first year engineering students to a computer engineer's way of thinking and will focus on the engineering principles of how computer-aided systems work and fail and the engineering practice of how they are designed, built and valued. Students will be presented a practical computer engineering system, e.g., a sensor-assisted autonomous vehicle, a drone, or an engineering event. They are then guided to reconstruct the system via interconnected subsystems through laboratory sessions and group discussions, to explain using engineering principles how the system works and could fail.	4	PC4131 and PC4132			4	
5	2	EG5434V	Honours in lieu	NUS/EE1111A Electrical Engineering Principles and Practice I	This course introduces first year electrical engineering students to what engineers do and to the engineer's thought process. This is the first of a two-part course: Engineering Principles and Practice (EPP) I and II. Real engineering systems will be used to show how engineers use different disciplines of engineering to make things work. Through grasping engineering fundamentals, students learn how engineering systems work and fail (EPP I). Through learning where systems get energy and how they are controlled, students learn how multi-disciplinary concepts are tied together (EPP II). Students will also learn basic design, experimentation and evaluation of engineering systems.	4	PC4131 and PC4132			4	
5	2	EG5435V	Honours in lieu	NUS/ESP1111 Engineering Principles in Action	Students will learn engineering fundamentals like forces & equilibrium, dynamics and understand how materials and structures work and fail. They will also learn the importance of safety in conducting engineering activities, units and dimensions, significant numbers, how to make good guesses to solve engineering problems, vector mechanics and create engineering drawings. The students apply these concepts through building a wooden tower, taking full control of its design, modelling and construction. They will test their towers on a shake-table, and the team with the best design, based on a pre-determined set of metrics, will be given due recognition.	4	PC4131 and PC4132			4	
5	2	EG5436V	Honours in lieu	NUS/ESE2101 Environmental Engineering Principles & Practice	This course aims to excite first year engineering students about Environmental Engineering and the science and engineering principles that underlie Environmental Engineering applications. The course equips students with knowledge, critical thinking, computer-aid analysis, and practical experiences that are fundamental to Environmental Engineering. Basic environmental chemistry, microbiology, and hydraulics will be examined through a project-based learning. Thus, students will learn basic principles of chemical and biological processes and will be exposed to the concept of hydraulics. The lab-style teaching provides opportunities for hands-on experiences in 3D model design,	4	PC4131 and PC4132			4	

					digitalization, big-data analysis, and system analysis for environmental pollution control.						
5	2	EG5437V	Honours in lieu	NUS/IE1111R Industrial & Systems Engineering Principles & Practice I	This course introduces first year industrial and systems engineering students to various problems in this field and how they can be analysed and tackled through mathematical modelling, data analytics, simulation and quantitative decision making. By working on a series of carefully curated problems, students gain an appreciation for the challenges faced when tackling large complex problems under uncertainty.	4	PC4131 and PC4132			4	
5	2	EG5438V	Honours in lieu	NUS/MLE1001B Materials Science & Engineering Principles & Practice I	This is the first of a two course set: Engineering Principle and Practice I and II (EPP I and EPP II) to introduce first year students to how materials engineers think and address societal problems. EPP I will use hands-on lab experiences with state-of-the-art applications of both soft materials (e.g. polymers whose applications span drug delivery to aircraft windows) and hard materials (e.g. silicon, whose applications span transistors to solar cells) integrated with targeted chemistry and physics lecture content to understand how these materials work. Instruction on experimental methods, and both oral and written scientific communication are key learning objectives.	4	PC4131 and PC4132			4	
5	2	EG5439V	Honours in lieu	NUS/ME1102 Engineering Principles & Practice I	This is part 1 of a 2-course package – Engineering Principles and Practice - that introduces Year 1 students to what engineers do and the engineer's thought process. EPP I focuses on the engineering principles of how systems work and fail, and the engineering practice of how they are designed, built and valued. Given a practical engineering system, e.g. a drone, or an engineering event, e.g. the Challenger space shuttle disaster, students are guided to deconstruct the system into inter-connected sub-systems. Following which they will develop an understanding of how forces, energy flow and/or mass flow between sub-systems impact the whole.	4	PC4131 and PC4132			4	
5	2	EG5441V	Honours in lieu	NUS/EG1311 Design & Make	This course covers the fundamentals of engineering design and prototyping. Students will learn design principles and tools through lectures and engage in experiential learning through group design projects. A stage-based design process will be covered. Students will develop skills in Arduino-controlled electronics, CAD modelling, and rapid prototyping to demonstrate their ideas.	4	PC4131 and PC4132			4	This course is also offered in Year 6 Sem 1
5	2	EG5442V	Honours in lieu	NUS/DTK1234 Design Thinking	In this course, students use design principles to develop their creative potential and practise design thinking using a people-centered approach to solve problems and create new possibilities. Through practical activities, students will discover tools and mindsets that guide them in navigating ambiguity in a creative process, observing and learning from others in unfamiliar contexts, and generating and experimenting with ideas quickly. While students draw on design thinking as a personal creative skillset, they will also value the impact of design that affords people the opportunity and privilege to shape the world that they, and others, inhabit.	4	PC4131 and PC4132			4	This course is also offered in Year 6 Sem 1
5	1	PC5131	Core (Major)	Advanced Physics III	This course provides an introduction to some advanced topics in physics. These include Rotational Motion, Mechanical Waves, the Doppler Effect, Superposition & Standing Waves, Beats, Interference, Single Slit Diffraction, Multiple Slit Diffraction and Ray Optics.	4	PC4131 and PC4132			4	

5	2	PC5132	Core (Major)	Advanced Physics IV	This course provides an introduction to some advanced topics in physics. These include Nuclear Physics, Black body radiation, the Photoelectric Effect, the Compton Effect, Wave-Particle Duality, Line Spectra, Quantum Tunnelling.	4	PC4131 and PC4132			4	
5	1	PC5231	Elective	Physics Olympiad Training VI	This course covers challenging problems in physics and can be taken as preparation for the Singapore Physics Olympiad (SPhO).	2	PC4232			1.5	
5	2	PC5232	Elective	Physics Olympiad Training VII	This course covers challenging problems in physics and can be taken as preparation for the Singapore Physics Olympiad (SPhO).	2	PC5231			1.5	
5	1	PC5431	Honours	Calculus-based Physics I	This course provides an introduction to the use of advanced mathematical techniques such as differentiation and integration to analyse and solve physics problems. Some topics on Mechanics and Electricity & Magnetism will be revisited with the application of calculus in problem-solving, where appropriate.	2	PC4131 and PC4132			2	
5	2	PC5432	Honours	Calculus-based Physics II	This course builds on PC5431 and exposes students to the use of advanced mathematical techniques such as solving ordinary differential equations to analyse and solve problems in Physics.	2	PC5431			2	
5	2	PC5432V	Honours in lieu	NUS/PC2032 Classical Mechanics I	This course considers the principles of Newtonian Mechanics and covers topics such as kinematics, inertial and non-inertial reference frames, linear momentum, kinetic energy, and angular momentum; Newton's laws of motion, forces and torques; systems of many particles including rigid bodies; conservation laws; Newtonian gravity and Kepler's laws of planetary motion.	4	PC5431			4	3 NUS courses can be read in lieu to fulfil NUSHS Physics Honours requirement: 1) PC1101/ Frontiers of Physics (Most students will take this in Y6Sem2 which will be NGNE only, special case can take it in Y5Sem2 to fulfil Honours in lieu) 2) PC2131/ Electricity & Magnetism I 3) PC2132/ Classical Mechanics I
6	1	EG5441V	Honours in lieu	NUS/EG1311 Design & Make	This course covers the fundamentals of engineering design and prototyping. Students will learn design principles and tools through lectures and engage in experiential learning through group design projects. A stage-based design process will be covered. Students will develop skills in Arduino-controlled electronics, CAD modelling, and rapid prototyping to demonstrate their ideas.	4	PC4131 and PC4132			4	This course is also offered in Year 5 Sem 2
6	1	EG5442V	Honours in lieu	NUS/DTK1234 Design Thinking	In this course, students use design principles to develop their creative potential and practise design thinking using a people-centered approach to solve problems and create new possibilities. Through practical activities, students will discover tools and mindsets that guide them in navigating ambiguity in a creative process, observing and learning from others in unfamiliar contexts, and generating and experimenting with ideas quickly. While students draw on design thinking as a personal creative skillset, they will also value the impact of design that affords people the opportunity and privilege to shape the world that they, and others, inhabit.	4	PC4131 and PC4132			4	This course is also offered in Year 5 Sem 2
6	1	EG6430V	Honours in lieu	NUS/BN2111 Biomedical Engineering	This course is the second of a set of two courses: Engineering Principle and Practice I and II (EPP I and EPP II). EPP courses aim to introduce first year students to the biomedical engineer's way of thinking and	4	EG5430V (NUS/BN1 111)			4	

				Principles and Practice II	addressing problems. A real-life medical technology will be used to demonstrate the fundamental knowledge and skills that a biomedical engineer is expected to possess. In EPP II, students will be exposed to key engineering problems such as how systems are controlled, powered and optimized.						
6	1	EG6431V	Honours in lieu	NUS/CN2102 Chemical Engineering Principles and Practice II	This course is the second part of a two-part course designed to provide first year Chemical and Biomolecular Engineering students with an experiential exposure to the foundational concepts of Biomolecular/Biochemical/Bioprocess Engineering, including mass and energy balances, biosafety and sterile handling, bioreaction kinetics, bioreactor design, downstream processing and purification, etc., through a series of hands-on experimental laboratories. In the laboratory, they will learn to carry out measurement, data collection, analysis, interpretation and presentation. The laboratory sessions will be blended with real engineering applications of industrial and societal relevance to Singapore.	4	EG5431V (NUS/CN1101A)			4	
6	1	EG6432V	Honours in lieu	NUS/CE2155 Principles of Structural Mechanics and Materials	This course equips students with knowledge and skills in structural mechanics, and materials for structural engineering. The topics introduce the fundamentals of material constitutive behaviours and failure models to appreciate the use of materials in structural design. The topics also cover the composite, micro-structure and properties of concrete, steel and wood, with an emphasis on the mix-design of concrete. The course is compulsory for civil engineering undergraduate students without which he will not be qualified to practise as a professional civil engineer.	4	EG5432V (NUS/CE1103)			4	
6	1	EG6433V	Honours in lieu	NUS/CG2111A Engineering Principles and Practice II	This course will be for the students who have completed EPP I and the project scope extends to handle challenges in large-scale systems. Similar to EPP I, students will first learn the fundamental principles on certain advanced concepts and then design and programme a real-world system. The course involves designing a complex computer engineering system that facilitates information processing, real-world interfacing, and understanding the effects of certain useful metrics such as, scaling, safety, security, sustainability, societal impact, fault-tolerant design, etc.	4	EG5433V (NUS/CG1111A) & NUS course CS1010 or CS1010 placement Exam			4	
6	1	EG6434V	Honours in lieu	NUS/EE2111A Electrical Engineering Principles and Practice II	This course is the second part of the two part course Engineering Principles and Practice (EPP) I and II and follows closely the same learning objectives. Most modern engineering systems are more electric. They convert some raw form of energy, such as fuel, mechanical or energy stored in battery, into electrical form. We see this in every engineering system from trains, biomedical devices, chemical plants, electric cars, aircrafts and ships to ICT devices such as computers, handphones, tablets etc. Hence, energy conversion, distribution, and sensing & control will form the backbone of this knowledge segment.	4	EG5434V (NUS/EE1111A)			4	
6	1	EG6435V	Honours in lieu	NUS/ESP2111 Sensor System Electronics	This course introduces students to the fundamental electronic principles of sensor systems for a variety of different disciplines. Particular emphasis will be given to circuits that are used in research and development, such as sensor amplifiers, filters, and data-acquisition. The course has both analogue and digital circuit principles, and involves	4	EG5435V (NUS/ESP1111)			4	

					project activities that involve hands-on construction of sensors, their circuits and translating their signals into digital data on to a computer.						
6	1	EG6436V	Honours in lieu	NUS/ESE2102 Principles & Practice in Environmental Monitoring	Singapore is committed to become the World's greenest city but how can economic development and environmental sustainability combine to create a truly liveable place? Engineers have a significant role to play in developing technical solutions that must be practical and economically feasible. In this course, students practice environmental engineering outside the classroom by teaming up as consultancy firms to undertake real-life projects: for example, monitoring water quality in the Singapore Botanic Gardens or mapping air pollution by drone sensing.	4	EG5436V (NUS/ESE 2101)			4	
6	1	EG6437V	Honours in lieu	NUS/IE2111 Industrial & Systems Engineering Principles & Practice II	This course introduces the principles and practice of engineering economics and financial decision making faced by engineers. Students will learn how to deal with the financial and economic aspects in the design, evaluation and management of engineering systems involving capital investments and cash flows over time. Topics covered include principles and practices of cash flow analysis, decision making involving single and multiple alternatives, depreciation of capital assets and after-tax project cash-flow analysis, replacement analysis of capital assets, and dealing with risk & uncertainty. Case studies and computational tools will be used to model, analyse and solve complex problems effectively.	4	EG5437V (NUS/IE11 11R)			4	
6	1	EG6438V	Honours in lieu	NUS/MLE2001A Materials Science & Engineering Principles & Practice II	We will explore what makes materials the way they are and why. We will discover the structure of the materials that make up our modern world and learn how it influences the properties, performance and applications of these materials. We will learn the difference between amorphous and crystalline materials, learn how the materials structure can be measured, and show that materials defects are responsible for the functionality of our computers, steel bridges or airplanes. The significance of these issues in modern industry will be emphasized through case studies.	4	EG5438V (NUS/MLE 1001B)			4	
6	1	EG6439V	Honours in lieu	NUS/ME2104 Engineering Principles & Practice II	Part II of Engineering Principles and Practice will focus on the engineering principle of how systems are energized and controlled and the engineering practice of how they are designed, built and valued. Most modern engineering systems are powered electrically. They convert some raw form of energy such as fuel (petrol, diesel) or battery (electrochemically stored energy), into electrical energy. Hence energy sources and energy conversion, electrical energy utilization through conversion into various functions, measurement of functions through their performance parameters will form the backbone of this course.	4	EG5439V (NUS/ME 1102)			4	
6	2	PC6131	Core (Major)	Advanced Physics V	This course provides an introduction to some advanced topics in physics. These include Temperature & the Kinetic Theory of Gases, the First Law of Thermodynamics and Heat Engines, as well as an introduction to Special Relativity	4	PC5131 and PC5132			4	
6	1	PC6132	Core (Major)	Practical Circuitry & Introductory Electronics	This course equips students with the necessary knowledge and skills for circuit analysis. Students are introduced to basic components such as resistors, capacitors and inductors and concepts such as Kirchhoff's Voltage Law and Kirchhoff's Current Law. Emphasis is placed on the development of practical skills where students spend time in the laboratory setting up and analysing circuits using equipment such as	4	PC5131 and PC5132			4	

					digital multimeters and oscilloscopes. This course also introduces students to the basics of electronics with a focus on diodes and progresses to the design of rectifiers and finally to a simple DC power supply. Students will also be introduced to the workings of a bipolar junction transistor.						
6	1	PC6431V	Honours in lieu	NUS/PC2031 Electricity & Magnetism I	This course considers the fundamentals of Electricity and Magnetism and covers topics such as: electrostatic fields, Coulomb's law and Poisson's equation; magnetostatic fields, Biot-Savart's law and Poisson's equation; time-varying electric and magnetic fields, Faraday's and generalised Ampere's laws; Maxwell's equations and electromagnetic waves in vacuum.	4	PC5431			4	3 NUS courses can be read in lieu to fulfil NUSHS Physics Honours requirement: 1) PC1101/ Frontiers of Physics (Most students will take this in Y6Sem2 which will be NGNE only, special case can take it in Y5Sem2 to fulfil Honours in lieu) 2) PC2131/ Electricity & Magnetism I 3) PC2132/ Classical Mechanics I
6	1	PC6432	Honours	Numerical Modelling of Physical Systems	This course provides an introduction on the application of numerical methods and computational modelling to Physics problems. Through these, students pick up valuable computational modelling skills to analyze physical systems and gain greater physical insights into the phenomena or systems under study.	2	PC5431			2	
6	2	PC6433	Honors	Introduction to Current & Emerging Topics in Physics	The course aims to give students an introductory understanding of selected current and emerging topics in Physics.		PC5431			2	
6	1	PC6435V	Honours in lieu	NUS/PC1101 Frontiers of Physics	This course gives students of all backgrounds the opportunity to understand the philosophical underpinnings of physics, and hence that of all natural sciences. Students will be exposed to the big ideas and fundamental concepts in physics, learn about the key historical experiments as well as the latest ideas at the frontiers in physics, such as quantum computing, exoplanets, and the grand unified theory.	4	PC5431			4	3 NUS courses can be read in lieu to fulfil NUSHS Physics Honours requirement: 1) PC1101/ Frontiers of Physics (Most students will take this in Y6Sem2 which will be NGNE only, special case can take it in Y5Sem2 to fulfil Honours in lieu) 2) PC2131/ Electricity & Magnetism I 3) PC2132/ Classical Mechanics I

English Language and Literature

1 Introduction

The English Language curriculum is a six-year programme with nine core courses that students will undergo and must pass to fulfil the requirements for graduation with the NUS High School Diploma.

Foundational Literature is incorporated into the Year 1 and 2's English Language course, EL1131 and EL2131. Students can opt for Literature as their choice of humanities in Year 2 and 3, and their 4th major in Year 4, 5 and 6.

In addition, English Language and linguistics elective courses are offered to further develop the talent and passion of selected students.

2 Overview of the courses

English Language

The English Language and Literature Curriculum aims to nurture students who are world-ready thinkers and communicators. Students will communicate effectively in varied contexts as a result of their development in listening, reading, speaking and writing. More importantly, it seeks to develop in students a broad and mature understanding of a range of subject matter pertaining to the local and world affairs as well as the ability to analyse and evaluate them critically and creatively. In addition, the programme hopes to cultivate students' literary consciousness, lifelong interest in the language, love for and appreciation of texts of varied genres, which will enable their journey in self-directed learning.

The curriculum adopts a constructivism approach, which engages the learner in making meaning from authentic texts and using language in real-world contexts. For every course, an integrated and holistic strategy is used, to ensure acquisition of key language skills in listening, reading, speaking and writing. Class time will be devoted to critical and creative thinking, decision-making, learning-focused interaction and problem-solving in authentic contexts.

The curriculum in Years 1 and 2 focuses on the appreciation and creation of literary works and functional texts. Through text types such personal recounts, narratives, descriptive works, poetry, and plays, the courses aim to develop students' language and literary skills. The study of Literature and skills of literary analysis will be incorporated in the English Language courses. In addition, students will be introduced to a wide range of functional texts like factual recounts and information reports. They will apply knowledge of textual and linguistic features to communicate effectively for real world purposes.

In Year 3, 4 and 5, students will be introduced to expository and argumentative texts. Through exposure to a broad range of expositions and other text types covering various social issues and concepts, students will learn to understand, appreciate and analyse arguments and persuasive elements in these texts. They will acquire techniques in responding to arguments and writing expository essays.

In Year 3 and 4, students will apply these skills to complete authentic tasks such as the creation of advertisements and collaterals; writing and presenting advocacy speeches, campaigns, reports and proposals. Themes related to society such as family, education, youth, the aged, media, the arts and culture, crime, science and technology, and prejudice and discrimination will be studied.

In Year 5, students acquire knowledge and understanding of diverse topic areas through extensive reading, group discussions and independent research. These topic areas include the study of globalisation; nation and policies; politics; science and ethics as well as local and global forces/events shaping the world. They will develop skills in analysing and evaluating varied world issues across disciplines, and understand their significance and implications for the individual, nation and the global community. They will continue to hone their skills in critical reading and formulating cogent arguments.

In Year 6 Semester 1, students will be introduced to academic writing and reading skills to prepare them for the university, and to expand their potential as thinkers, writers and communicators. In Year 6 semester 2, students will opt for one reading/writing or linguistic course based on their interest and ability.

Students must pass all English Language core courses in Year 3 to 6 to fulfil the requirements for graduation with the NUS High School Diploma. As English Language is a process skills subject where class attendance and participation are imperative for skills development, the department does not allow for exemption or acceleration of courses.

English Literature

Through a broad selection of literary texts that include representative works from various genres and periods, the Literature programme aims to:

- Nurture students to be Readers for Life who can appreciate different genres of Literature and its contribution to the human civilisation
- Groom students to be proficient in understanding various literary forms and its features in achieving specific desired ends
- Facilitate students to form perceptive thought and original ideas towards what they read
- Guide students towards an objective, conscious and critical discussion reflective of both emotional and intellectual awareness of themes, characters, settings and contexts
- Develop students to be able communicate and present effectively and convincingly with proper analysis and evaluation in both the written and spoken mode

Foundational Literature is incorporated into the Year 1 and 2's English Language courses, EL1131 and EL2131. These foundational courses are pre-requisites for optional higher-level courses offered in the subject.

Students can opt for Literature as their choice of humanities in Year 2 and 3, and their 4th major in Year 4, 5 and 6.

Years 2 and 3 will form the developing stage to the 3 main genres of Literature – Prose, Poetry and Play. For Prose, students will actively engage in the study of Fiction in both the form a Novel and Short Fiction. For Poetry, students will experience a broad selection of poetry from different cultures and eras. Students will also explore both local and international theatre in their study of Play. Each course will be grounded within an over-arching theme as a focal point of exploration for both breadth and depth.

Years 4, 5 and 6 will progress students from developing students of Literature to being advanced students with a richer and more diverse experience of Literature whilst simultaneously rooting them deeper into the study of specific ideas of critical reading and thinking. Students will have to read extensively and intensively representative works of recognised literary merit spanning across different eras, movements and genres. The courses

will be categorised according to periods and topics. Their study will culminate in an independent research programme which will take the form of an extended essay. The extended essay will be an investigation into the transformation of literary works either across genres/periods.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 and 2	EL1131	Core	Language and Literary Studies I	This year-long course aims to deepen students' understanding of Self & Identity through four distinct thematic units: Friendship, Family, Choices and Belonging. Through these thematic units, students will acquire the skills to write various text types/genres spanning from prose, poetry and play. Students will also explore and engage with a litany of multi-modular texts including the course's main novel A Wrinkle in Time, as well as short stories, plays poems and movies. Students will also develop their reading comprehension skills as well as poetry analyses. Students will also learn how to construct structured responses in the form of P-E-E to express their appreciation of writer's style, characterisation and setting in short prose excerpts. Additionally, students will also develop their oratorical skills through exploring collaborative discussions, oral presentations and Readers' Theatre.	8	None			4	Year long course
2	1 and 2	EL2131	Core	Language and Literary Studies II	This year-long course will build on students' existing knowledge and language skills and help them further develop the reading, writing, listening and speaking skills acquired from EL1131: Language and Literary Studies I. The course will explore the overarching theme of Self and Conflict through four underlying sub-themes: Man Vs Self, Man Vs Society, Man Vs Man and Man Vs Nature. In Semester 1, students will explore the themes of Man Vs Society and Man Vs Self through a compilation of short prose from Singapore and beyond. Students will enhance their narrative writing skills through the study of advanced literary devices such as foreshadowing, symbolism, irony and internal monologue; as well as by exploring alternative plot structures. For their reading component, students will continue to hone their close and critical reading skills by examining authors' intentions and effects achieved through the use of literary devices in narrative text types. For their project work, students will complete a multimedia literacy project that will develop their skills in factual recounts and pictorial communication. In Semester 2, students will explore the themes of Man Vs Man and Man Vs Nature through a compilation of crime stories. Students will gain a deeper knowledge of crime narratives genre conventions and get the opportunity to generate original crime stories of their own. They will develop a video trailer to promote their stories to an audience of their peers. Students will also expand their reading repertoire by being introduced to expositions where they can reinforce their summary skills and develop an informed and substantiated opinion on issues of relevance to the themes of the course in both the written and oral forms.	6	EL1131			3	Year long course
3	1 and 2	EL3131	Core	Exposition and Argumentation: Community and Society	This year-long course introduces the skills of critical reading and expository writing. Students will learn foundational skills in expository writing—to form claims, substantiate them with ample relevant evidence and elaboration and to put forth a convincing argument. They will be exposed to themes of family, education, youth and the aged through reading material, writing activities and class discussions. This course also focuses on functional texts in real life settings where they get to apply their knowledge of textual and linguistic features to communicate effectively for real world purposes.	6	EL2131			3	Year long course
4	1 and 2	EL4131	Core	Critical Reading and Writing I: Social	This course is designed as an intermediate course on the essential skills needed for an English Language learner to be fluent and confident in expressing arguments and opinions in an academic and convincing manner. Through the analysis of emerging	6	EL3131			3	Year long course

				Institutions and Issues	issues/trends in the mass media; crime and punishment; science and technology; prejudice and discrimination, students will gain a broad and mature understanding of the topics and apply them in specific reading, writing and oral communication tasks. In addition, key controversies arising from social institutions like the family and education will be examined. Other than argumentative essay and reading comprehension components, students will also be assessed through oral presentations and research. Varied sources of texts will be used to broaden content knowledge and promote critical reading and inquiry. This is a year-long course that spans two semesters. In the course of the course, students are encouraged to take a proactive and independent approach in broadening current affairs knowledge.						
5	1 and 2	EL5131	Core	Critical Reading and Writing II: The Global Connection	As an intermediate course in the English Language in the senior years, this course seeks to further develop students' fluency and confidence in expressing arguments and opinions about global issues. Through close analysis of emerging global issues as well as the study of political ideologies, international relations and emerging issues on conflicts and security, students will become critically aware of the ongoing and emerging concerns as global citizens. Students will also examine theoretical views useful for the construction and deconstruction of exposition, persuasion and argumentation in reading, writing, listening and speaking within an academic context, which will develop the students' critical and creative thinking abilities. Other than argumentative essays and application questions, students will also be assessed through oral presentations and research. Varied sources of texts will be used to broaden content knowledge and promote critical reading and inquiry. This is a year-long course that spans two semesters. In the course of the course, students are encouraged to take a proactive and independent approach towards broadening their current affairs knowledge.	4	EL4131			3	Year long course
5	1 and 2	EL5132	Core	Language for Public Communication	This year-long course focuses on effective communication in the public arena. In Semester 1, students will hone their writing skills by delving into the world of opinion-editorials. The second part of the course in Semester 2 seeks to develop students' understanding and use of language in science communication. Opinionated and yet grounded in facts, opinion-editorials or Op-eds, have the power to persuade readers. In learning to write their own Op-eds, students will be taught the skills needed to develop a strong personal voice. Students will also be taught to appreciate the importance of substantiating their opinions as they craft their op-eds. Apart from learning how to write an Op-ed, students will also learn to objectively evaluate their peer's work. Using the process approach to writing, students will work on their drafts, use the feedback to make improvements before their final submission. Semester 2 starts off with science communication to the lay audience. Students will study the principles of science communication and acquire linguistic strategies in communicating complex ideas in a lucid manner. Through creating and presenting TED talks in science topics, students will acquire content creation and oral delivery	2	EL4131			1	Year long course

					strategies to inform, educate, interest and engage lay audience. The second part of Semester 2 relates to science and research presentation to the scientific community. Using their ARP as springboard, students will learn to write a concise and effective abstract, and to present figures diagrams effectively in their research paper and poster.						
6	1	EL6131	Core	Critical reading and writing III: Emerging issues in a changing world	This is a semester long course which will further develop the foundational critical thinking skills built in the last two years' courses. This course aims to enhance their reasoning skills in terms of synthesising various themes of knowledge for insightful conclusions. Through the study of emerging socio-political issues in Singapore and the global context, students will become critically aware of the current and evolving concerns as global citizens. Aside from essay writing, students will also be assessed through a literature review, personal reflection and panel discussion. Varied text types such as newspapers, magazines and periodicals will be used to promote critical thinking and inquiry.	2	EL5131 and EL5132			3	
6	1 and 2	EL6132	Core	Language for Personal and Professional Communication	This year-long course focuses on effective communication in the public arena. In Semester 1, students will hone their writing skills by delving into the world of personal narratives. The second part of the course in Semester 2 seeks to develop students' competencies and skills that will be useful for college/university and the workplace. By the end of the course, students will be more fluent, confident, and effective communicators and writers. Semester 1: Personal Essay/ Narrative This class will explore the relatively new genre of creative non-fiction which conveys true stories using literary techniques usually associated with fiction. Also known as literary nonfiction, creative nonfiction encompasses many sub-types: the personal narrative essay, memoir, the interview, the profile, the diary, biography, autobiography, travel writing, nature writing, science writing, and writing about sports. EL6132 will focus on writing the personal narrative/ essay (college application essay). Semester 2: Personal Branding, Social Finesse and Interview Skills Personal branding is the conscious effort to create and influence public perception of an individual by elevating their credibility and differentiating themselves. Semester 2 of the course focuses on cultivating a personal brand and articulating it in speech and writing. Students will learn to craft a personal statement of achievement and a profile video with elevator pitch to showcase their skills and experiences. To prepare students for the tertiary education and the workplace, the course also will focus on refining students' email communication skills and interview skills.	2	EL5131 and EL5132			1	Year long course
6	2	EL6133	Core	Advanced Academic Reading and Writing: Language and Society	* Through academic texts and research, students will gain appreciation of the interplay between language, culture society, and delve into how they can be applied to enhance modern-day communication. Other than developing a strong foundation for the basic academic writing requirements at the university level, students will develop a scholarly and practical understanding of how society and culture influence language and vice versa. Students will be guided through the critical reading of academic journal articles and learn how to distil and apply relevant information into the creation of new academic	2	EL6131			3	*Students have a choice of one course, subject to department's approval

					knowledge. Through literature review assessment for their research topic of interest, students to be critical readers for academic purposes where they discern the value of secondary sources. The landmark assessment comes in the form of a micro-lesson on a communication-related topic, where students will share their academic findings as well as the related practical communication tips with their target audience.						
6	2	EL6134	Core	Understanding Discourse	* This course will explore discourse and expose students to frameworks and approaches to analysing it. Different types of discourse can be seen as linguistic representations of particular worldviews. A critical perspective on the analysis of specific discourses, whether oral or written, aims to promote the general awareness that language is used to construct and perpetuate particular viewpoints, and through such linguistic constructions, specific (power) relationships are maintained. By virtue of the fact that discourse involves the situated use of language in relevant sociocultural contexts, it is an orientation that promotes the crossing of disciplinary borders.	2	EL6131			3	*Students have a choice of one course, subject to department's approval
6	2	EL6135	Core	Advanced Creative Writing	* This semester-long course will allow students to generate fiction, poetry or creative non-fiction. It will include significant close reading and discussion of notable literary models, completion of writing assignments and prompts, and peer review workshops. Students are expected to work on their own portfolios of poems, stories or creative non-fiction. The workshop framework is at the heart of the writing, reading and discussion of creative writing in this course. Selected readings will cover both canonical as well as contemporary creative writing. The best works may be published in school periodicals and other publications, as well as entered in competitions.	2	EL6131			3	*Students have a choice of one course, subject to department's approval
2	1 and 2	EN2131	Core	Literary Genres I	This is a year-long course to familiarise students with the core Literary genres of Poetry, Prose and Play. Students will study the novel "To Kill A Mockingbird" by Harper Lee and learn about the themes of Prejudice & Discrimination and Justice. They will also consider the bildungsroman aspect which will deal with ideas of Coming of Age and Change.The course will also cover "Student Plays" by Desmond Sim to acquire an understanding of various local concerns and themes. Students will also be introduced to a repertoire of local and international poems to hone their analysis and appreciation.	4	EL1131			2	Year long course
3	1 and 2	EN3131	Core	Literary Genres II	This is a year-long course that will expose students to the literary stylistics of the novel and play. Students will study the novel "Haroun and the Sea of Stories" by Salman Rushdie which will immerse them in the world of fantastical storytelling and inspire them to think about how stories shape our identity, kinship, and our society. The course will also introduce students to the world of Shakespearean theatre through Romeo and Juliet where they will immerse themselves in the beauty of Elizabethan language and consider themes such as Love, Family, Individual vs Society amongst others. On top of the novel and play, students will also be enriched through a diverse range of poetry from "Poetry Moves".	6	EN2131			3	Year long course
4	1	EN4131	Core (Major)	Detective Fiction	This semester long course will introduce students to the role and function of the detective figure in selected crime fiction. Students will write informed and persuasive essays to display their interpretation of authors' intentions as well as their engagement with themes/issues within the novels with a discerning selection of persuasive literary	3	A minimum of 'B' grade for EL1131/EL			3	

					evidence. Additionally, students will have to work on an alternative assessments and deliver an oral presentation on one of the course's core texts.		2131/EL3131				
4	2	EN4132	Core (Major)	Speculative Fiction	This semester long course will introduce students to the broad spectrum of science fiction and fantasy. Students will write informed and persuasive essays to display their interpretation of authors' intentions as well as their engagement with themes/issues within the novels with a discerning selection of persuasive literary evidence. Additionally, students will have to work on an alternative assessments and deliver an oral presentation on one of the course's core texts.	3	A minimum of 'B' grade for EL1131/EL2131/EL3131			3	
4	1	EN4231	Elective	Games and Narratology	As a relatively newer medium for storytelling and communication, video games have brought new possibilities for readers to experience a story. In this course, students will study the appeal games as a literary text. Students will explore the unique affordances that a game, as a multimedia medium, has in creating meaning, story and art. Students will learn how to analyse game elements such as interactivity, game mechanics and other conventions of the medium. Students also learn how to express their interpretation of themes through close reading. The course will then explore concepts of narratology in the context of games.	2	NIL				
4	1	EN4231	Elective	Games and Narratology	As a relatively newer medium for storytelling and communication, video games have brought new possibilities for readers to experience a story. In this course, students will study the appeal games as a literary text. Students will explore the unique affordances that a game, as a multimedia medium, has in creating meaning, story and art. Students will learn how to analyse game elements such as interactivity, game mechanics and other conventions of the medium. Students also learn how to express their interpretation of themes through close reading. The course will then explore concepts of narratology in the context of games.	2	NIL				
5	1	EN5132	Core (Major)	20th Century American Literature	In this course, students will study selected works representing 20th Century American Literature and its relevant themes. Students will write informed and persuasive essays to display their interpretation of the authors' intentions as well as their engagement with themes/issues within the novels with a discerning selection of persuasive literary evidence. Additionally, students will have to work on an independent research project by studying a related secondary text of their choice as well as deliver an oral presentation on one of the course's core texts.	4	Year 4 Literature			3	
5	2	EN5134	Core (Major)	Utopias and Dystopias	In this course, students will explore notions of Utopias and Dystopias with respect to societal societal structures, politics and governance and gender roles. Students will also write informed and persuasive essays to display their interpretation of authors' intentions as well as their engagement with themes/issues within the novels with a discerning selection of persuasive literary evidence. Additionally, students will have to work on an alternative assessments and deliver an oral presentation on one of the course's core texts.	4	Year 4 Literature			3	
6	2	EN6131	Core (Major)	Advanced Research in Literature	This is an independent research in literature course that fulfills part of the overall requirement for all literature students majoring in the subject. Students will have to embark on a rigorous research topic of their choice and conduct a thorough literature review. By the end of the course, students will demonstrate a balanced, sound and well-researched evaluation of their selected literary topic/text presented in both the written and oral form.	4	Year 5 Literature			3	Year long course - students will only submit their completed

											research essay and oral presentation in Semester 2.
6	1	EN6132	Core (Major)	Postcolonial Literature	In this course, students will study selected works representing Postcolonial Literature and its relevant themes. Students will write informed and persuasive essays to display their interpretation of the authors' intentions as well as their engagement with themes/issues within the novels with a discerning selection of persuasive literary evidence. Additionally, students will have to work on an independent research project by studying a related secondary text of their choice as well as deliver an oral presentation on one of the course's core texts.	4	Year 5 Literature			3	

Mother Tongue and Foreign Languages

The Mother Tongue & Foreign Languages Department of NUS High School of Math & Science offers core, elective and enrichment language courses to our students. These courses serve to cater to the varying learning needs of our students from different cultural backgrounds. The department aims to provide our students with the language foundation required for tertiary education, and to develop in them the aptitude for language learning.

The core courses offered are Higher Mother Tongue and Mother Tongue for Chinese, Malay and Tamil. Third Languages, namely French, Japanese, Malay as Third Language and Chinese as Third Language are offered as elective courses. The enrichment courses offered are the Mother Tongue Syllabus B for Chinese, Malay and Tamil.

Courses are offered to students in accordance with their language abilities and interests, and with strict adherence to the national Mother Tongue Policy.

The Mother Tongue Policy
(MT Requirements for Admission to Local Universities)

The Mother Tongues (MT) officially refer to Chinese, Malay and Tamil. Under the Mother Tongue Policy, it is compulsory for NUS High students to fulfill either *ONE* of the following MT requirements for admission to the local universities (NUS, NTU, SMU & SUTD):

- a minimum 'D7' grade in the GCE O Level Higher Mother Tongue Examination
- a minimum 'S' grade in the GCE A Level H1 Mother Tongue Examination
- a pass in the GCE A Level Mother Tongue Syllabus B Examination

NUS High students taking

- Higher Mother Tongue will sit for the GCE O Level Higher MT Examination in Year 4.
- Mother Tongue will sit for GCE A Level H1 MT Examination in Year 5.
- Mother Tongue Syllabus B will sit for GCE A Level MT Syllabus B Examination in Year 5.

Students will seek approval from the Ministry of Education (MOE) to take Mother Tongue-in-lieu under the following circumstances:

- Students whose Mother Tongue is a Non-Tamil Indian language can apply to take either Bengali, Gujarati, Hindi, Punjabi or Urdu.
- Returning Singaporeans who have stayed overseas for an extended period of time can apply to take an Asian Language (Arabic, Burmese or Thai) or a Foreign Language (French, German or Japanese).

If students take Mother Tongue in-lieu, the MOE-approved subject will be considered as the Mother Tongue language subject.

Students who are unable to fulfill the MT or MT-in-lieu requirements for admission to local universities but satisfy all other requirements will be admitted on a provisional basis. During the course of under-graduate study, they will be required to attend the MT courses conducted by the university or attain the minimum requirement by retaking the MT paper at the GCE A level Exam before they are allowed to graduate.
Exemption from MTL or MTL-in lieu is granted based only on either of the following stringent conditions:

- Students who are suffering from a specific learning disability such as dyslexia or autism.
- Students who joined Singapore's education system mid-stream.

Parents may apply to MOE for approval of their child's exemption from taking MT or MT-in-lieu through the school. Students who have been exempted from taking MT or MT-in-lieu at the PSLE will continue to be exempted at NUS High School.

Students who are exempted from MT or MT-in-lieu will be deemed to have met the requirements for admission to local universities.

No student is allowed to drop MTL or MTL-in-lieu unless written approval has been obtained from MOE.

MOTHER TONGUE COURSES (CHINESE/ MALAY/ TAMIL)

Mother Tongue language courses are offered to students as Core Courses. These core courses are parked under Higher Mother Tongue Language (HMTL) course and Mother Tongue Language (MTL) course, which is a four-year and five-year course respectively. Students will opt for either the Higher Mother Tongue or the Mother Tongue course, based on their eligibility and suitability. Both courses progressively equip students with Mother Tongue proficiency in four main aspects, namely listening, speaking, reading and writing. Upon completion of the four-year Higher Mother Tongue course or the five-year Mother Tongue course, students would have acquired oral presentation skills, listening skills, reading and comprehension skills, as well as essay and summary writing skills at the intermediate level. Upon completion of either course, students are required to sit for the GCE 'O' Level HMTL Exam at end of Year 4 or GCE 'A' Level H1 MTL Exam at end of Year 5.

With approval from MOE, students who offer a Mother Tongue in-lieu at one of the MOE-approved centres will be deemed to have offered the Mother Tongue in-lieu concerned as a core course in our school. For such courses, 'M' is indicated at the end of the course code. For example, BG1531M denotes the course code for Bengali I in the case of students taking the Bengali (Non-Tamil Indian Language) course conducted at a MOE-approved centre.

For students who find it difficult to cope with MTL courses, they can opt to take up MTL Syllabus 'B' courses instead. However, approval must be sought from the school before opting for MTL Syllabus 'B' courses and the opting can only be carried out at appropriate stages. MTL Syllabus 'B' courses are offered to students as Enrichment Courses. Upon taking up the MTL Syllabus 'B' course, students are to complete this course and pass GCE A Level MTL 'B" Exam at end of Year 5.

FOREIGN/ THIRD LANGUAGE COURSES (FRENCH/ JAPANESE/ CHINESE/ MALAY)

The school offers French, Japanese, Chinese as 3rd Lang and Malay as 3rd Lang as Elective Courses. These courses are offered to the following categories of students:
(1) Having the interest to study a Third Lang on top of their Mother Tongue
(2) Opting to study French or Japanese as MTL-in-lieu (with approval from MOE)
(3) Having the interest to study one of these languages purely for interest, even if they are exempted from MTL (this applies to some of the foreign students)

The four-year French and Japanese courses prepare students for DELF (Diploma in French Studies) & JLPT (Japanese Language Proficiency Test) respectively. The four-year Chinese

as 3rd Lang and Malay as 3rd Lang courses equip students with language competencies required for sitting for GCE 'O' Level Chinese/Malay Special Programme even though some of them may not be eligible to sit for these exams.

Upon completion of any of the 4 third language courses mentioned above, students are expected to achieve communicative competence in simple everyday situations and personal interaction in French, Japanese, Chinese or Malay. Having attained this level of learning would indicate that students have acquired the language foundation necessary for advancement to the next level of learning.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 and 2	CH1531	Core	Higher Chinese I	This course focuses on equipping students with structural guidelines and rhetorics that will enable them to develop narrative and descriptive writing skills at the Intermediate level. Under the section of interactive writing, students will learn how to write informal emails, discuss current affairs and share personal experiences. Students will acquire browsing and close reading skills that will equip them with the correct answering techniques in reading and comprehension. Through class discussions and group work, students will develop active listening skills and acquire oral and presentation skills.	6	None			3	Year long course
1	1	CL1231	Elective	Chinese as 3rd Language IA	This course is opened to students who have no prior Chinese language background. This course touches on the basics, such as an overview of the evolution of Chinese characters and an introduction to phonetics (the Hanyu Pinyin system). More emphasis will be given to the oral and listening components.	3	None			3	
1	2	CL1232	Elective	Chinese as 3rd Language IB	This course is a continuation of CL1231. At the end of the course, pupils will acquire basic conversational and writing skills in Mandarin. Please refer to Description for CL1231.	3	CL1231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for CL1231 in order to advance to CL1232.
1	1 and 2	CL1331	Enrichment	Basic Chinese I	This course aims primarily to develop oral communication and listening skills through pictorial conversations and audiovisual clips. In addition, students will be taught basic reading skills through short passages.	6	None			3	Year long course
1	1 and 2	CL1531	Core	Chinese I	This course focuses on contextual learning of words and phrases, which form the basics for language acquisition. Reading and comprehension will go hand in hand with the learning of words and phrases. Much emphasis will be given to the acquisition of oral and listening skills, other than the learning of narrative writing skills at the intermediate level. Under the section of functional writing, students will learn how to write informal emails with reference to daily life.	6	None			3	Year long course
2	1 and 2	CH2531	Core	Higher Chinese II	In this course, students will build on their existing knowledge and skills. Under writing, they will further develop and enhance their skills in descriptive and narrative writing, as well as acquire relevant skills in expository writing. Argumentative writing will also be introduced to hone the students' critical thinking skills. While brushing up on informal emails, they will be introduced to formal emails. Through reading more complex narrative passages,	6	CH1531			3	Year long course

					students will learn how to interpret underlying meanings. Through class discussions and group work, students will develop active listening skills and acquire oral and presentation skills. Various platforms will be provided for students to reinforce their oral skills.						
2	1	CL2231	Elective	Chinese as 3rd Language IIA	This course is a continuation of CL1232 and it is meant only for students who have completed and passed CL1232. The course emphasises the learning of new vocabularies, the constructing of simple sentences and writing of short compositions. The course also aims to equip pupils with comprehension and conversational skills in Chinese.	3	CL1232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for CL1231 in order to advance to CL1232.
2	2	CL2232	Elective	Chinese as 3rd Language IIB	This course is a continuation of CL2231. Please refer to Description for CL2231.	3	CL2231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for CL1231 in order to advance to CL1232.
2	1 and 2	CL2331	Enrichment	Basic Chinese II	At this level of learning, students will continue to develop their oral communication skills through structural analysis of a conversational topic. Writing skills will be developed further through using common phrases and idioms in pictorial composition as well as sentence construction. Writing of emails will also be introduced.	6	None			3	Year long course
2	1 and 2	CL2531	Core	Chinese II	This course focuses on equipping students with narrative and descriptive writing skills at the intermediate level. Continued emphasis will be given to the acquisition of oral and listening skills. Under the section of functional writing, other than continuing with informal emails that pertain to daily life, students will also learn to discuss and analyse current affairs via emails. More platforms will be provided for students to hone their presentation skills.	6	None			3	Year long course
3	1 and 2	CH3531	Core	Higher Chinese III	The course focuses on equipping students with more advanced writing skills. More emphasis will be given to argumentative writing. In addition, they will also be taught skills in speech writing. Under the section of functional writing, students will continue to brush up on the writing of emails, both formal and informal. In addition, they will be introduced to the writing of blogs and forums, which require critical thinking and analytical skills in response to current affairs. In preparation for national exams, students will be taught summary writing skills as well as correction of ungrammatical sentences. More lesson time will be allocated to	8	CH2531			3	Year long course

					oral presentations which will prepare students for their oral report in the exams. Interactive learning will continue to be an important feature of the classroom climate.						
3	1	CL3231	Elective	Chinese as 3rd Language IIIA	This course is a continuation of Chinese as 3rd Lang Level 2 and it is meant only for students who have completed and passed CL2231 and CL2232. The course will equip students with stronger conversational and writing skills. Comprehension skills will be enhanced with the grasp of Chinese vocabularies. This will be an important preparatory stage for students who intend to sit for the GCE 'O' Level Chinese Special Programme Examination upon completion of the 4 year programme.	3	CL2232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for CL1231 in order to advance to CL1232.
3	2	CL3232	Elective	Chinese as 3rd Language IIIB	This course is a continuation of CL3231. Please refer to Description for CL3231.	3	CL3231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for CL1231 in order to advance to CL1232.
3	1 and 2	CL3331	Enrichment	Basic Chinese III	At this level of learning, students will strengthen their oral communication skills by listening to narrated stories and knowing how to infer and draw conclusions from them. Comprehension skills will also be enhanced through learning how to process and organise information. The ability to write complex sentences with phrases and idioms will be developed. The writing of narrative essays and emails will be taught in greater depth.	6	None			3	Year long course
3	1 and 2	CL3531	Core	Chinese III	This course focuses on equipping students with more advanced writing skills. More emphasis will be given to argumentative and expository writing. Under the section of functional writing, other than informal emails, students will learn to write formal emails. To prepare students for national exams, there will be a greater emphasis on training of oral presentation skills on top of the teaching of writing skills. Reading and comprehension will take precedence over rote learning of words and phrases.	6	None			3	Year long course
4	1 and 2	CH4531	Core	Higher Chinese IV	In this course, there will be a continued emphasis on the training of advanced writing skills, with more reference to current affairs. In preparation for national exams at the second half of the year, more time will be allocated to the drilling of summary writing, correction of ungrammatical sentences, answering techniques in comprehension and presentation skills required in oral reports based on video clips.	8	CH3531			3	Year long course
4	1	CL4231	Elective	Chinese as 3rd Language IVA	This course is a continuation of Chinese as 3rd Lang Level 3 and it is meant only for students who have completed and passed CL3231	3	CL3232			3	*Pre-requisites refer to students having to pass the

					and CL3232. The course will serve to enhance students' conversational and writing skills, comparable to the standards required for the year-end GCE 'O' Level Chinese Special Programme Exam.						course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for CL1231 in order to advance to CL1232.
4	2	CL4232	Elective	Chinese as 3rd Language IVB	This course is a continuation of CL4231. Please refer to Description for CL4231. Completing this course marks the completion of the entire programme (level 1 to level 4).	3	CL4231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for CL1231 in order to advance to CL1232.
4	1 and 2	CL4331	Enrichment	Basic Chinese IV	At this level of learning, students will be taught critical thinking skills, which will be used in enhancing their oral communication skills. Students will continue to sharpen their writing skills by constructing complex sentences and learning how to write argumentative essays. The scope of emails will also include current affairs, hence requiring students to be objective and analytical.	6	None			3	Year long course
4	1 and 2	CL4531	Core	Chinese IV	In this course, the training of argumentative and expository writing skills will continue to be the main focus. To equip students for national exams, more lesson time will be allocated to oral presentations. Interactive learning will continue to be an important feature of the classroom climate. Reading and comprehension will take precedence over rote learning of words and phrases. Students will also be introduced to basic summary skills to prepare them for H1 Chinese in Year 5.	8	None			3	Year long course
5	1 and 2	CL5331	Enrichment	Basic Chinese V	To better prepare students for the oral presentation segment in the national exams, students will be taught critical thinking skills at a higher order. This will be useful in conversations that require reasoning and analytical skills. The writing of argumentative essays will be the focus for developing writing skills.	6	None			3	Year long course
5	1 and 2	CL5531	Core	Chinese V	This course will equip students with the necessary skills to prepare for their oral report during the national exams. Other than honing oral presentation skills, students will develop more advanced reading skills so as to have a deeper understanding of the text. In addition, students will be taught how to write complex narrative and argumentative essays to further develop their competency in writing.	8	None			3	Year long course
1	1	FR1231	Elective	French as 3rd Language IA	*This course is opened to those who have no prior French language background. The course fee per month is $100 and charged for the*	3	None			3	*Pre-requisites refer to students having to pass the

					WHOLE Semester (Jan – Jun). This course focuses on basic linguistic and communicative structures of the French language. By developing the four skills of listening, speaking, reading and writing as well as teaching basic grammar and vocabulary, it aims at helping students achieve communicative competence in simple everyday situations and personal interaction. The course also attempts to help students optimise their learning by teaching strategies for language learning and language use. Audio and video materials are used. The course provides an insight into French culture. Sessions are interactive.						course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for FR1231 in order to advance to FR1232. **For students taking French as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as FR1531 (and not FR1231).
1	2	FR1232	Elective	French as 3rd Language IB	*The course fee per month is $100 and charged for the WHOLE Semester (Jul - Dec). This course is a continuation of FR1231. Please refer to Description for FR1231.*	3	FR1231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for FR1231 in order to advance to FR1232. **For students taking French as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as FR1531 (and not FR1231).
2	1	FR2231	Elective	French as 3rd Language IIA	*The course fee per month is $100 and charged for the WHOLE Semester (Jan - Jun). This course focuses on basic linguistic and communicative structures of the French language. By developing the four skills of listening, speaking, reading and writing as well as teaching basic grammar and vocabulary, it aims at helping students achieve communicative competence in simple everyday situations and personal interaction. The course also attempts to help students optimise their learning by teaching strategies for language learning and language use. Audio and video materials are used. The course provides an insight into French culture. Sessions are interactive.*	3	FR1232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for FR1231 in order to advance to FR1232. **For students taking French as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as FR1531 (and not FR1231).

2	2	FR2232	Elective	French as 3rd Language IIB	*The course fee per month is $100 and charged for the WHOLE Semester (Jul - Dec). This course is a continuation of FR2231. Please refer to Description for FR2231.*	3	FR2231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for FR1231 in order to advance to FR1232. **For students taking French as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as FR1531 (and not FR1231).
3	1	FR3231	Elective	French as 3rd Language IIIA	*The course fee per month is $100 and charged for the WHOLE Semester (Jan - Jun). This course focuses on basic linguistic and communicative structures of the French language. By developing the four skills of listening, speaking, reading and writing as well as teaching basic grammar and vocabulary, it aims at helping students achieve communicative competence in simple everyday situations and personal interaction. The course also attempts to help students optimize their learning by teaching strategies for language learning and language use. It provides an insight into French culture. Sessions are interactive.*	3	FR2232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for FR1231 in order to advance to FR1232. **For students taking French as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as FR1531 (and not FR1231).
3	2	FR3232	Elective	French as 3rd Language IIIB	*The course fee per month is $100 and charged for the WHOLE Semester (Jul - Dec). This course is a continuation of FR3231. Please refer to Description for FR3231.*	3	FR3231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for FR1231 in order to advance to FR1232. **For students taking French as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as FR1531 (and not FR1231).

4	1	FR4231	Elective	French as 3rd Language IVA	*The course fee per month is $100 and charged for the WHOLE Semester (Jan - Jun). This course is a continuation of French as Foreign Language Level 3 and it is meant only for students who have completed and passed FR3231 and FR3232. This is the end of the four-year programme. At the end of this course or at the end of the academic year, students should be able to sit for the DELF A2 Examination. And with more self-preparation, students could even perhaps sit for the DELF B1 Examination. This course focuses on more advanced linguistic and communicative structures of the French language. By developing the four skills of listening, speaking, reading and writing as well as teaching basic grammar and vocabulary, it aims at helping students achieve communicative competence in simple everyday situations and personal interaction. The course also attempts to help students optimise their learning by teaching strategies for language learning and language use. The course provides an insight into French culture. Sessions are interactive.*	3	FR3232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for FR1231 in order to advance to FR1232. **For students taking French as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as FR1531 (and not FR1231).
4	2	FR4232	Elective	French as 3rd Language IVB	*The course fee per month is $100 and charged for the WHOLE Semester (Jul – Dec). This course is a continuation of FR4231. Please refer to Description for FR4231. Completing this course marks the completion of the entire programme (level 1 to level 4).*	3	FR4231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for FR1231 in order to advance to FR1232. **For students taking French as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as FR1531 (and not FR1231).
1	1	JP1231	Elective	Japanese as 3rd Language IA	*This course is opened to students who have no prior Japanese language background. The course fee per month is $100 and charged for the WHOLE Semester (Jan - Jun). The goal of this course is to acquire communication skills in the Japanese language in order to interact with native speakers of Japanese in a culturally appropriate manner. Students will also learn how to read and write simple texts in hiragana and katakana. By the end of the semester, students should be able to make simple greetings, introduce people, communicate while shopping, ask for information such as time, prices etc., ask for directions, and invite people.*	3	None			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for JP1231 in order to advance to JP1232. **For students taking Japanese as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will

											be reflected as JP1531 (and not JP1231).
1	2	JP1232	Elective	Japanese as 3rd Language IB	*The course fee per month is $100 and charged for the WHOLE Semester (Jul - Dec). This course is a continuation of JP1231. Please refer to Description for JP1231.*	3	JP1231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for JP1231 in order to advance to JP1232. **For students taking Japanese as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as JP1531 (and not JP1231).
2	1	JP2231	Elective	Japanese as 3rd Language IIA	*The course fee per month is $100 and charged for the WHOLE Semester (Jan - Jun). This course builds upon the basis of Japanese Level 1 and aims to develop basic linguistic and socio-cultural skills to expand the repertoire of the daily topics and situations with simple structures. Approximately 110 kanji and 180 kanji-words will be introduced. While more emphasis is placed on the development of oral communication skills, students will also learn how to read and write simple and short compositions.*	3	JP1232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for JP1231 in order to advance to JP1232. **For students taking Japanese as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as JP1531 (and not JP1231).
2	2	JP2232	Elective	Japanese as 3rd Language IIB	*The course fee per month is $100 and charged for the WHOLE Semester (Jul - Dec). This course is a continuation of JP2231. Please refer to Description for JP2231.*	3	JP2231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for JP1231 in order to advance to JP1232. **For students taking Japanese as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will

											be reflected as JP1531 (and not JP1231).
3	1	JP3231	Elective	Japanese as 3rd Language IIIA	*The course fee per month is $100 and charged for the WHOLE Semester (Jan - Jun). Building upon the basis of Japanese Level 2 (JP2231 & JP2232), this course develops students' ability to communicate and expands the repertoire of daily topics and situations. Complex structures such as transitive and intransitive, conditionals and passive forms are introduced. Approximately 150 kanji and 200 kanji - words will be introduced. With this knowledge of characters, student s will be able to understand and write simple and short essays.*	3	JP2232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for JP1231 in order to advance to JP1232. **For students taking Japanese as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as JP1531 (and not JP1231).
3	2	JP3232	Elective	Japanese as 3rd Language IIIB	*The course fee per month is $100 and charged for the WHOLE Semester (Jul - Dec). This course is a continuation of JP3231. Please refer to Description for JP3231.*	3	JP3231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for JP1231 in order to advance to JP1232. **For students taking Japanese as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as JP1531 (and not JP1231).
4	1	JP4231	Elective	Japanese as 3rd Language IVA	*The course fee per month is $100 and charged for the WHOLE Semester (Jan - Jun). Building upon the basis of Japanese Level 3 (JP3231 & JP3232), this course aims to further develop students' communication skills in Japanese on daily topics of general interests. The course has a special focus on polite expressions which enables students to communicate appropriately in academic and business situations. Appropriately 150 kanji and 200 kanji-words will be introduced. With this knowledge of characters, students will be able to understand letters with fairly formal written language. This course will complete the four year course of elementary Japanese and will equip students with good foundation to progress to intermediate and advance levels of Japanese studies.*	3	JP3232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for JP1231 in order to advance to JP1232. **For students taking Japanese as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will

											be reflected as JP1531 (and not JP1231).
4	2	JP4232	Elective	Japanese as 3rd Language IVB	*The course fee per month is $100 and charged for the WHOLE Semester (Jul - Dec). This course is a continuation of JP4231. Please refer to Description for JP4231. Completing this course marks the completion of the entire programme (level 1 to level 4).*	3	JP4231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for JP1231 in order to advance to JP1232. **For students taking Japanese as Mother Tongue in lieu, this course will be regarded as a core course. As such, the course code will be reflected as JP1531 (and not JP1231).
1	1 and 2	MH1531	Core	Higher Malay I	This course aims to equip students with strong communication skills, acquire and disseminate information effectively and generate ideas through the use of the Malay language. It also aims to deepen students' understanding and appreciation of the Malay language, history and culture. There will be emphasis on building strong communication skills, critical-thinking and problem-solving, more lesson time will be allocated to oral presentations and debate sessions.	6	None			3	Year long course
1	1	ML1231	Elective	Malay as 3rd Language IA	This course is opened to students who have no prior Malay language background. This course aims to equip pupils with the skills of understanding standardised spoken Malay language. At the end of the program (i.e. at the 4th level), students should be able to converse fluently in Malay language on common everyday situations that people might talk about as well as being understood by native speakers. In this course, students will acquire language skills through participation in various communicative and written tasks. Through the exposure to the language, students will develop a general understanding of the Malay culture, the sociolinguistic and pragmatic aspects of the language. They will be given exposure to simple poetry and prose.	3	None			3	
1	2	ML1232	Elective	Malay as 3rd Language IB	This course is a continuation of the skills developed in Semester One. Oral and listening skills will continue to be emphasised in this course. Communicative skills will be garnered through various forms, such as role-plays, skits, short speeches, etc. Reading and writing skills will be exposed to them as well. Grammar aspects will continue to be taught through interactive approach.	3	ML1231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50%

											for ML1231 in order to advance to ML1232.
1	1 and 2	ML1331	Enrichment	Basic Malay I	This course focuses on contextual learning of words and phrases, which form the basics of language acquisition. Reading and comprehension will go hand in hand with the learning of words and phrases. Much emphasis will be given to the acquisition of oral and listening skills.	6	None			3	Year long course
1	1 and 2	ML1531	Core	Malay I	This course aims to equip students with effective communication skills, acquire and disseminate information and generate ideas through the use of the Malay language as well as appreciate and understand various forms of Malay cultures. Much emphasis will be given to the acquisition of oral and listening skills. Under the section of functional writing, students will learn how to write personal emails with reference to daily life.	6	None			3	Year long course
2	1 and 2	MH2531	Core	Higher Malay II	In this course, students will be exposed to literature, which include poetry, plays, essays, biography, and autobiography. This course focuses on the development of skills in expository and persuasive writing.	6	MH1531			3	Year long course
2	1	ML2231	Elective	Malay as 3rd Language IIA	This course will build on the skills of ML1232. Students will be able to understand main contents of essays, poetry and prose. They will also be able to produce various forms of writing skills which evolve around common everyday situations and current affairs through various writing structures and styles. This course also aims to provide understanding and awareness of the traditions and cultures of the Malay community which indirectly will help the students find its relevance to their own culture.	3	ML1232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for ML1231 in order to advance to ML1232.
2	2	ML2232	Elective	Malay as 3rd Language IIB	This course will build on the skills taught in Semester One. Pupils will continue to be exposed to understand various forms of writing skills. Emphasis will also be given to their reading fluency and pronunciations. Educational trips (such as home stay) may also be embarked upon, to enhance their interest and to provide deeper understanding and awareness of the traditions and cultures of the Malay community.	3	ML2231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for ML1231 in order to advance to ML1232.
2	1 and 2	ML2331	Enrichment	Basic Malay II	This course focuses on expanding the use of vocabulary words through oral presentations, group work and individual assessments. There will also be an active use of mobile technology to enhance and encourage students' acquisition of the language skills. Students will continue to be exposed to various forms of media to enhance their current knowledge on the Malay language and culture.	6	None			3	Year long course

2	1 and 2	ML2531	Core	Malay II	This course emphasizes on honing the students' grammar skills. Students will be exposed to developing figurative and evaluative language, developing the noun group using adjectival phrases as well the noun-verb relationship: subject-verb agreement. Continued emphasis will be given to the acquisition of oral and listening skills. Under the section of functional writing, other than continuing with personal emails that pertain to daily life, students will also learn to discuss and analyse current affairs via email. More platforms will be provided for students to hone their presentation skills.	6	None			3	Year long course
3	1 and 2	MH3531	Core	Higher Malay III	This course aims to equip students with a higher order of critical thinking skills. As such, language skills acquisition at this level will be deeply entrenched on students' reasoning skills. More lesson time will be allocated to oral presentations which will prepare students for their oral report in the exams. Interactive learning will continue to be an important feature of the classroom climate.	8	MH2531			3	Year long course
3	1	ML3231	Elective	Malay as 3rd Language IIIA	This course will build on the skills of ML2232. Pupils will be more exposed in their four language skills of listening, speaking, reading and writing. It also aims to provide the pupils with more communicative competence in simple everyday situations and personal interaction. As with the other earlier courses, this course also aims to provide an understanding and awareness of the traditions and cultures of the Malay community which will help the students appreciate the learning of the language.	3	ML2232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for ML1231 in order to advance to ML1232.
3	2	ML3232	Elective	Malay as 3rd Language IIIB	This course is a continuation of the skills developed in Semester One. Pupils will continue to be exposed in their four language skills of listening, speaking, reading and writing. It also aims to provide the pupils with more communicative competence in simple everyday situations and personal interaction. In this semester, pupils' understanding and awareness of the traditions and cultures of the Malay community will be enhanced through experiential learning, such as Learning Journeys.	3	ML3231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for ML1231 in order to advance to ML1232.
3	1 and 2	ML3331	Enrichment	Basic Malay III	This course aims to give more emphasis in developing students' functional writing skills. Various forms of reading and writing materials will be introduced to the students. Students will be guided to work on their writing skills, to understand, analyze and be able to develop substantial reasoning in their work.	6	None			3	Year long course
3	1 and 2	ML3531	Core	Malay III	This course focuses on equipping students with more advanced writing skills. More emphasis will be given to argumentative and expository writing. Under the section of functional writing, other than informal emails, students will learn to pen formal emails. To prepare students for national exams, there will be a greater	6	None			3	Year long course

					emphasis on training of oral presentation skills, on top of the teaching of writing skills.						
4	1 and 2	MH4531	Core	Higher Malay IV	This course continues to equip students with language acquisition skills through the use of critical thinking skills. There will be a continued emphasis on the training of advanced writing skills, with more reference to current affairs and controversial topics. In preparation for national exams at the second half of the year, more time will be allocated to the drilling of summary writing, correction of ungrammatical sentences, answering techniques in comprehension and presentation skills required in oral reports based on video clips.	8	MH3531			3	Year long course
4	1	ML4231	Elective	Malay as 3rd Language IVA	This course is critical in enhancing holistic learning for the pupils. A more rigorous and comprehensive approach will be adopted throughout the whole semester. At this stage, pupils are expected to have a sound mastery of the four language skills of listening, speaking, reading and writing. Applying all of these language skills at a higher level in their presentations and projects are among the pre-requisites of this course.	3	ML3232			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for ML1231 in order to advance to ML1232.
4	2	ML4232	Elective	Malay as 3rd Language IVB	As the final course of the 4-year programme, pupils will be further equipped with all the essential skills that are required for higher learning. They are further exposed to various tools of communication, both formal and informal. Understanding the culture and society goes beyond speaking the language but immersing oneself in it and appreciating the culture as a whole. At this stage, pupils will gain more exposure into the language, culture and lifestyle of the Malay community, local and beyond for further insights. Completing this course marks the completion of the entire programme (level 1 to level 4).	3	ML4231			3	*Pre-requisites refer to students having to pass the course by attaining at least 50% (overall) in order to advance to the next level. For example, students will be required to attain at least 50% for ML1231 in order to advance to ML1232.
4	1 and 2	ML4331	Enrichment	Basic Malay IV	This course aims to enhance the students' proficiency in their essential language skills. They should be able to articulate in 'Bahasa Baku' (standard Malay), with much clarity and fluency. At this stage, students will continue to develop their writing skills, and be prepared for the national examination.	6	None			3	Year long course
4	1 and 2	ML4531	Core	Malay IV	This course aims to develop students' writing skills at a more advanced level. Students will also be further exposed to critical thinking skills in both oral and writing assessments. To equip students for their national exams, more lesson time will be allocated to oral presentations based on video clips and debate sessions. Interactive learning will continue to be an important feature of the classroom climate.	8	None			3	Year long course
5	1 and 2	ML5331	Enrichment	Basic Malay V	This course aims to further develop students' language skills as they are now more exposed to the various language genres. This course will introduce students to current issues, Students will be	6	None			3	Year long course

					given the opportunity to work on their language skills through various forms of assessments, such as peer-critic, group work as well as individual project presentations. This course will also continue to expose students to the Malay culture and arts.						
5	1 and 2	ML5531	Core	Malay V	This course focuses on enhancing students' knowledge and grasping broader concepts of current issues as the curriculum covers a wide range of topics which require students' depth of knowledge in these issues. Focus will be on exposing students to concepts through analysis of newspaper and magazine articles, as well as through social media. Various platforms will be provided for students to reinforce their oral skills.	8	None			3	Year long course
1	1 and 2	TH1531	Core	Higher Tamil I	This course helps to develop students' reading, writing, listening and speaking skills needed to become effective users of the Tamil language. This course enhances students' vocabulary through quizzes, marabhuthodargal, enaimozhigal, uvamaiththodargal and proverbs. Students will learn to write informal emails, descriptive and narrative essays. Students will deepen their understanding of their culture through doing project work.	6	None			3	Year long course
1	1 and 2	TL1331	Enrichment	Basic Tamil I	This course aims to develop students' reading, listening and speaking skills that are needed to become effective users of the Tamil language. Students will learn to write informal emails and provide their comments or opinions in the web forum. Students will deepen their understanding of their culture through doing project work.	6	None			3	Year long course
1	1 and 2	TL1531	Core	Tamil I	This course aims to develop students' reading, writing listening and speaking skills that are needed to become effective users of the Tamil language. Through marabhuthodargal and enaimozhigal students will learn and understand the language in depth. This course will also equip students with narrative writing skills at the intermediate level. Students will learn to write informal emails with reference to daily life.	6	None			3	Year long course
2	1 and 2	TH2531	Core	Higher Tamil II	This course helps to strengthen the students' communication skills. Students will learn to write formal emails and comments in the web forum. They will further develop and enhance their descriptive and narrative writing skills. Argumentative writing will also be introduced to hone the students' critical thinking skills. Through classroom discussions and group work, students will develop active listening skills and acquire oral and presentation skills. Various platforms will be provided for students to reinforce their oral skills.	6	TH1531			3	Year long course
2	1 and 2	TL2331	Enrichment	Basic Tamil II	This course helps to strengthen the students' communication skills. Students will further develop their speaking and listening skills. They will continue to work on improving their writing skills pertaining to informal email and web forum comments. Through	6	None			3	Year long course

					classroom discussions and group work, students will develop active listening skills and acquire oral and presentation skills.						
2	1 and 2	TL2531	Core	Tamil II	This course aims to help the students develop their reading, writing, listening and speaking skills needed to become effective users of the Tamil language. Through marabhuthodargal, enaimozhigal, uvamaiththodargal and proverbs, students will learn and understand the language in depth. This course develops and further enhances students with narrative and descriptive writing skills. They will also learn to write emails with reference to current affairs.	6	None			3	Year long course
3	1 and 2	TH3531	Core	Higher Tamil III	This course focuses on equipping students with more advanced writing skills. More emphasis will be given to argumentative and expository writing. This course emphasis more on summary writing, comprehension writing skills and more practice will be given on cloze passage and text editing. Students will also learn through various modes of instructions such as classroom discussions, debates, project presentations and peer critiques.	8	TH2531			3	Year long course
3	1 and 2	TL3331	Enrichment	Basic Tamil III	This course focuses on equipping students with more advanced oral skills. More emphasis will be given to listening and speaking skills. In this course, more practice will be given on cloze passages and reading comprehension. Students will also learn through various modes of instructions such as classroom discussions, project presentations and peer critiques. Email writing and giving comments in the web forum will be taught in greater depth. Students will be given opportunities to develop their public speaking skills through oral presentation.	6	None			3	Year long course
3	1 and 2	TL3531	Core	Tamil III	This course focuses on equipping students with more advanced writing skills, such as argumentative and expository writing. Along with email writing, students will learn to write their comments or opinions in the web forum. There will be more practice on cloze passages and sentence completions. Students will be given opportunities to develop their public speaking skills through oral presentations in the classroom.	6	None			3	Year long course
4	1 and 2	TH4531	Core	Higher Tamil IV	This course will further refine students' comprehension and summary writing skills. The overall aim of this course is to reinforce students' speaking, reading, listening and writing skills. More practice will be given based on the exam components. At the end of the course, students should be proficient in the speaking, reading, and writing of Tamil language, as well as in their listening skills.	8	TH3531			3	Year long course
4	1 and 2	TL4331	Enrichment	Basic Tamil IV	This course will further refine students' speaking and listening skills. More practice will be given based on the exam components. Under functional writing, students will have more practice on email writing and web forum writing. More practice will be given to prepare the students to sit for the national examination.	6	None			3	Year long course

4	1 and 2	TL4531	Core	Tamil IV	This course focuses more on sharpening the students' writing skills. This course helps to develop students' argumentative and expository writing skills at the advanced level. Under functional writing, students will have more practice on email writing and forum writing. Students will be given opportunities to develop their public speaking skills through the oral presentation in class. More practice will be given to prepare the students for the national examination.	8	None			3	Year long course
5	1 and 2	TL5331	Enrichment	Basic Tamil V	This course aims to improve the students' students' reading, writing, listening and speaking skills needed to become effective users of the Tamil language. Students will be drilled on their oral presentation skills, writing skills and the use of technology to better prepare them for the national examination.	6	None			3	Year long course
5	1 and 2	TL5531	Core	Tamil V	This course aims to improve the students' communication skills through in-class presentations, debates and discussions on essays topics. Students will be taught to write complex narrative and argumentative essays to further develop their writing skills. They will learn the command of the language in more depth through the more advanced marabhuthodargal, enaimozhigal and uvamaiththodargal. They will also learn sorpunarchi.	8	None			3	Year long course

Humanities

The Humanities Curriculum at NUS High School aims to nurture our students into world-ready learners with humanitarian values. Students will have an appreciation and sustained interest in the world around them. They will also be adept at thinking critically and inventively, inspiring multiple and varied possibilities for the betterment of our community and society.

The Department offers a choice of three subject disciplines – History, Geography and Economics. Students will gain an introduction to the three independent disciplines by means of an Integrated Humanities course of study. They shall then have the option of pursuing either History or Geography in Years 2 – 3; and History, Geography or Economics in Years 4 - 6.

Integrated Humanities

The Integrated Humanities curriculum serves to lay the foundation for the three Humanities disciplines taught by the Department. Concepts and skills fundamental to the respective disciplines are imparted to prepare students holistically to manage the subjects at higher levels.

History

The History curriculum at NUS High School aims to provide students with a broader worldview and a better understanding of present global trends and international relations through a contemporary study of regional and international developments in the twentieth century. It highlights the importance of understanding and interpreting history in all its complexity – its people, events, developments and issues are explored in a historical context and examined from a range of perspectives. It enables students to better understand how the world they live in is shaped by the historical forces of the recent past.

The curriculum adopts a multi-faceted approach, and is designed around knowledge that is enduring and is organised around key themes and concepts or the “Big Ideas” that will guide students’ thinking and the learning outcomes. Constructivist teaching is emphasized which focuses on developing students to be active learners, as they engage in the learning to construct their own meanings.

Geography

The Geography curriculum is designed to manifest the dynamism of the subject as students study the interactions between man and the environment over time and space at the local, regional and global scales. It integrates both physical and human geography, and provides for the acquisition of scientific and socio-economic methodologies.

The curriculum focuses on the study and investigation of cause-effect relationships between man and the environment through the identification of trends and patterns, and the processes behind them. This is followed by the subsequent investigation into the adaptations, measures and management strategies meant to cope and deal with these interactions. Through the use of relevant named examples and case studies, the curriculum ensures that the consideration of varied perspectives, ideas and views is inherent in the curriculum. The Geography curriculum thus aims to develop in our students the values and attitudes of responsible citizens of an increasingly interconnected world. It will also strive to motivate them to reach a level of personal commitment to resolve the issues at different scales.

Economics

The study of Economics aims to provide students a broad understanding of national and international economic issues and challenges them to think critically through experiential learning and research. It aims to challenge students to investigate the economic issues on strategies of firms, efficiency, market failure and macroeconomic developments in the regional and international economies. Students will examine real world case studies; provide economic insights and conduct research and explore alternatives to achieve key economic goals.

Economics as a social science will broaden students' thinking as they examine human behaviour in response to changes and the way decisions are being made. Economics has a vital role to play in promoting international cooperation and mutual understanding because of its focus on global issues. To achieve this understanding, students will need to learn to consider economic theories, ideas, and events from the points of view of different stakeholders in the world economy.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 and 2	HU1131	Core	Humanities Studies I	Under Citizenship and Diversity, students explore the different factors shaping diversity in Singapore society. They would examine the growth of Singapore from a diverse to a united nation as well as the citizens' response over the years. The course introduces students to the complexity of citizenship and the competing needs and interests of different groups of people in a society; managing these would require trade-offs. Students would discuss the complementary roles of government and citizens in working for the good of the society. They would also look at the challenges and opportunities of diversity and the government's response in shaping harmony in society. Under the theme of Economic Development in this course, students would be introduced to the different phases and factors that bring about Singapore's economic development - from an economy that was focused on labour-intensive industries to the economy that was focused on capital-intensive industries and trade-oriented open economy. This theme of the course focuses on key events and measures that had shaped Singapore's economy over the years, and the people that had built our economic success. Students would also examine the importance of regional and global cooperation for Singapore's continued economic development.	4	None			2	Year long course
2	1 and 2	HU2131	Core	Humanities Studies II	This course focuses on the theme "Being Part of a Globalised World"; it seeks to explore multiple perspectives on the impacts of globalisation in three areas: economy, culture and security. Students will learn how the uneven impacts in each of these three areas result in tensions and trade-offs which can help them better understand the complex nature of globalisation. Students will also discuss how these impacts lead to different responses from countries, companies and individuals. The different responses and trade-offs mean that the tensions will continue to remain and shape debates and policy-making. In this course, students are grouped into delegations and are intensively involved in the research and the writing of position papers on global issues. This culminates in experiential learning in a model UN conference as students role-play as delegates and participate in debates on global issues and the writing of resolutions.	2	HU1131			1	Year long course
6	1 and 2	HU6131	Core (non-Major)	Capstone	The Capstone course is a year-long course. It aims to develop the higher-order qualities of mind in students and build the capacity to engage in inquiry in civic and general interest issues. Students build content and knowledge in the humanities discipline and multi-disciplinary issues through tapping into virtual learning platforms, e.g. MOOCs and adopting a reflective learning process. Students will choose a multi-disciplinary issue and conduct literature reviews, draft proposals and propose methodologies for research into this issue.	2	None	Humanities Majors and other students who have fulfilled the grade requirements in 2 approved Humanities electives.		1	Year long course

4	1	EC4131	Core (Major)	Economic Insights I	This course introduces the central problem of economics and guides students to use concepts of demand and supply to analyse markets. This course provides the foundation for firms' theory and spectrum of market competitions. Students will apply various theories to analyse the behaviour of firms in different market structures and explore the effects of the behaviour on efficiencies and society's welfare.	4	None			3	
4	2	EC4132	Core (Major)	Economic Insights II	This course introduces students to Macroeconomics. Students will learn and apply the tools economists use to describe and explain the macroeconomy. Students will investigate the reasons behind macroeconomic problems and explain governments' policies to resolve these problems. Students will also learn the trade theories and explore the reasons for international trade and why countries still adopt protectionism despite trade benefits.	4	None			3	
5	1	EC5131	Core (Major)	Economic Insights III	The course introduces the concepts of market failure and explores why the market fails and the effectiveness of government intervention in these markets. Students will critically evaluate market failure and associated policy effectiveness, focusing on externalities, public goods. The course will also explore the effects of market dominance, analysing how a firm's behaviour within various market structures will result in market failure.	4	None			3	
5	2	EC5132	Core (Major)	Economic Insights IV	This course equips students with additional tools to analyse the macroeconomy. Students will examine further the role of money in monetary policies and the objective of external stability in the balance of payment and exchange rates. Building upon the knowledge and skills in previous courses, students will examine the various causes of macroeconomic problems and discuss the effectiveness of governments in resolving these problems, focusing on the role of the Singapore government in dealing with past economic crises.	4	None			3	
6	1 and 2	EC6131	Core (Major)	Research in Economics	This is a year-long course. Students will be engaged in a rigorous process of individual investigation of an Economics issue/topic to complete a Research Paper for submission. The paper aims to reinforce and extend the learning of Economics concepts and skills. It challenges students to conduct an in-depth study and think critically about different perspectives. In the process, students develop the ability to formulate informed opinions about the chosen Economics issue in the real world.	4	None			3	Year long course
6	2	EC6132	Core (Major)	Economic Insights V	The course provides a deepening of Economics concepts mastered in the earlier courses. The course will examine both the rational and irrational decision-making processes of individuals. By applying consumer behaviour theory and understanding elements of behavioural economics, students will analyse the decision-making processes of consumers, producers, and governments. Finally, students will explore the concepts of risk, uncertainty and asymmetric information in affecting the decision-making process.	4	None			3	
2	1	GE2131	Core	Geography Studies I	This course focuses on the physical geography topics of weather and climate and deforestation in tropical rainforests, as well as map reading techniques. IN the topic of weather and climate, students are introduced to the Koppen-Geiger climate classification system which identifies 5 climatic zones based on temperature and precipitation together with natural vegetation. Students then learn about the weather elements and how each affects the weather and climatic	2	HU1131			2	

					conditions in different parts of the world. The study of the weather elements also includes the relevant weather instruments to collect weather data. Students apply their learning through the geographical investigation and fieldwork on their school grounds to collect authentic data for analysis as part of knowledge creation. They end the topic by studying the extreme weather conditions of tropical storms in terms of their causes, effects and management strategies. In the topic of deforestation of tropical rainforests, students learn about the unique characteristics and value of tropical rainforests first in order to enhance their appreciation for forest conservation and protection. Students explore the threats of deforestation and the challenges of forest protection and conservation through the lens of different cultures of the Amazon countries and their peoples. Through the study of the management issues and strategies employed in managing tropical storms and deforestation, students gain the awareness and a deeper understanding of the complexity of real-life issues that involve multiple stakeholders with diverse interests. Last but not least, students learn map reading techniques and interpretation skills as they practise with various topographical maps to make meaning of what they see on the maps.						
2	2	GE2132	Core	Geography Studies II	This is the second Geography course for all students at Year 2. In Semester 2, students cover the human geography topics on population dynamics and urban development. In population dynamics, students learn about population structures and gain a deeper understanding of factors contributing to demographic changes in a country or region over time. The course also focuses on pro-natalist and anti-natalist policies implemented in different countries to cope with demographic issues. The relationship between population change and the overall economic development of a country will be studied and discussed, using relevant named examples. In urban development, students explore the concepts of urbanisation and urban growth, as well as the benefits and challenges of urban development. The urban problems of transport and housing will be discussed and the measures to deal with them evaluated. As students explore the topics in the course, the distinction between the developing and the developed countries should serve to drive the message that there is no one-size-fits-all models, and students gain a deeper appreciation on the complexities of decision making.	2	GE2131			2	
3	1	GE3131	Core	Geography Studies III	This course is a core course. This course deals with the evolution of coastal landforms and features. It examines the coastal processes at work, the range of terrestrial, atmospheric, marine and biological factors that affect them, and the resultant changes that occur. The course also examines the environmental changes as a result of human action and changing land use in coastal zones, their ramifications and management strategies. This course also deals with the interiors of the Earth and its associated phenomena, landforms and features. The course examines the theories of continental drift, sea-floor spreading and plate tectonics in an attempt to understand the forces that helped shaped our planet. It explains the various forms of tectonic movements and their resultant landforms and features. It also looks at vulcanicity, earthquakes and other geographical phenomena resulting from tectonic activities and examines the often devastating	3	GE2132			3	

					consequences of these natural hazards as well as the ways people have learnt to respond to them.						
3	2	GE3132	Core	Geography Studies IV	This core course deals with three geography topics – Global Tourism, Food Resources and Health and Diseases at the global and local scales. In the topic of Global Tourism, students study the factors leading to the growth in tourism, the different types of tourism and their contribution to the economic development of a country. Students study and analyse the impacts of tourism development on people and the environment, and examine the issue of sustainable tourism management in different countries including Singapore. Under the topic of Food Resources, it focuses on food consumption, production and distribution patterns globally. It looks at the perplexing issue of food shortage leading to hunger in some countries and excess food resulting in obesity and food wastage in others. Students will also critically examine the role of technology in affecting food supply. With the concerns over increasing global population and environmental degradation, the possible solutions to food shortage are made more challenging and complex, going beyond just food supply. The topic on Health and Diseases focuses on the health of people and the main diseases affecting them. It examines the significance of people-environment interactions on diseases and mortality. It is concerned with the location and spatial spread of selected major diseases, the disease transmission cycles and intervention strategies to reduce disease burden. The course also studies the physical and socio-economic causes influencing the speed and agents of spread. Students will gain a deepened understanding of the relationship between unequal access to resources and physical well-being of people, as well as the importance of individual and collective responsibilities in responding to infectious diseases.	3	GE3131			3	
4	1	GE4131	Core (Major)	Geography Insights I	This course covers 2 main topics – (1) Fluvial Geomorphology and Hazard Management, and (2) Denudation and Mass Movements. In (1), the topic focuses on the interactions between man and the environment in the study of fluvial geomorphology and hazard management. Beginning with studying the drainage basin as a system, students learn how rivers work towards dynamic equilibrium through the fluvial processes of erosion, transportation and deposition as well as the factors influencing these processes. Students also examine flow and channel characteristics in influencing stream development and their related features and landforms. This topic ends off with a study on river management in the Mississippi River Basin and critically examine the impacts of man's modification of the natural environments and the attempts to control the forces of nature through hard and soft engineering. In (2), students study the geomorphic processes of weathering, erosion and mass movement, and the role they play in landform and slope development. Finally, it looks at landform evolution on selected rock types (granite & limestone) under different climatic conditions (temperate & humid tropical regions).	4	None			3	
4	2	GE4132	Core (Major)	Geography Insights II	The course begins with recognising and understanding the inseparable, and often difficult relationship between environment and development. Drawing from the 1987 report of the World Commission on Environment and Development, the course begins with the symptoms and causes of a threatened future namely,	4	None			3	

					poverty, growth, critical thresholds of our environment and economic using data and named examples. That provides the context to understanding sustainable development by exploring the concepts of needs and limitations at different scales. The theme of sustainable development would then be examined through the issue of climate change. The course focuses on the natural and anthropogenic causes of climate change and its effects on people and the environment, specifically in the areas of weather hazards and pollution. Students tap into, and build upon their prior knowledge of weather and climate with just-in-time inclusion of content concerning climatic variations such as Earth's energy budget, atmospheric circulation, and El-Nino Southern Oscillation, etc.. Varied responses and mitigation measures planned and implemented in developed and developing countries would be discussed. It would be apparent that there are no straightforward cookie-cutter solutions for the issues and challenges arising, and countries would need to participate and cooperate with commitment at the global, regional and national levels to reduce and manage the impacts of climate change.						
5	1	GE5131	Core (Major)	Geography Insights III	The course continues to explore the theme of sustainable development through urban development and management. Students learn and explore the factors affecting the pattern of residential areas within urban areas, including physical factors, land values, ethnicity and planning. They would also discuss the incidence of poverty, deprivation and informal activity in urban areas at varying stages of development. The course also highlights the economic and demographic processes bringing change over time to urban systems such as gentrification, urban renewal, suburbanisation and counter-urbanisation, as well as the consequences of these processes. Students have a chance to learn and explore the concept of liveability in cities as they investigate urban development through the lens of the elderly in terms of their needs and experiences, and discuss the strategies used in different cities to manage aspirations of the people. Through the study of waste management in cities and urban reimaging experiences, the course aims to build on students' prior knowledge of population dynamics and migration, urbanisation as well as climate change in order to appreciate the complexity of sustainable urban development.	4	None			3	
5	2	GE5132	Core (Major)	Geography Insights IV	The course focuses on: 1. skills-based learning where students appreciate and are given the opportunities to make use of enabling technologies such as GIS and knowledge and skills learnt in geography to examine, address, represent and communicate the associated geographical phenomena, patterns and distribution; 2. Ethical issues with the use of data sources and information (primary, secondary, online sources, powerful and open source technologies like GIS) during the process of data collection, manipulation, representation and communication. 1. Definition of GIS • What is GIS? o Construct definitions of GIS o Analytical capabilities of GIS	4	None			3	

					o Relevance of GIS • Describe components of GIS o Hardware, Software, Input, Output o Suggest enabling technologies, instruments and online resources to address geographical issues 2. GIS and Maps • What are maps? o Comparison the purpose and types of maps used for similar focus / themes o Examine Political, Social, Cultural, Economic considerations • Representation and Cartographic Communication of Map Outputs – Cartographer and Intended Audience o Map Representation and Interpretation of geospatial data – Geometric, Attribute, Temporal Data o Base Map Creation with key map elements 3. Earth and its Coordinate System • Map Projection o Datum, Latitude, Longitude o Spatial References, Coordinate Systems o Distortions and Preservations o Conformal, Equal-Area, Equal Distance o Conical, Cylindrical, Azimuthal 4. Principles of Cartography • Cartographic Design o Key Map Elements o Visual Hierarchy, Contrast, Figure Ground and Balance o Typography, Scale and Generalization o Symbolisation and Colours 5. Spatial Data and Data Models • Vector and Raster Data Models o Vector and Raster Data o Advantages and Disadvantages of Vector and Raster Model 6. Database Management System • Database Management System o Tabular Data, Hierarchical Data, Network Data, Relational Database o Advantages and Disadvantages for each database management system o Purpose of Relational Database Management in GIS o Construct Database Management in GIS • Database Creation o Data Inputs, Editing, Classification, Analysis, Representation, Communication						

					7. Data Quality, Issues, Ethics • Identify the types of Errors • Track and manage Errors • Monitor error propagation • Ethical Issues and Considerations 8. Costs and Benefits Analysis of Investing in GIS • Costs – Direct and Indirect • Benefits – Direct and Indirect • Organization, User, Implementation, System Needs and Changes • Benefits and Limitations of using GIS • Other applications of GIS						
6	1 and 2	GE6131	Core (Major)	Research in Geography	This course focuses on the completion of a Geography research paper. 1. Research Proposal: • Rationale for proposed research topic • Research Problem Statement • Research Questions 2. Literature Review • Critique of literature/sources for • theoretical insights • Relevance of literature to the proposed research 3. Methodology • A written plan on the design of the research investigation and method to collect data • Identify the chosen research instrument 4. Research Paper • A written paper consisting of the essential components of a research 5. Qualifying Test • Presentation on proposed research topic/question, lit reviews and proposed methodology 6. Oral Presentation • Presentation of final research paper to a panel (consisting of teachers from other Humanities disciplines)	4	None			3	Year long course
6	2	GE6132	Core (Major)	Geography Insights V	This course examines the relationship between economic growth and human development. Students study the globalisation of economic activities, and how configurations of economic activities across space affect people. They gain insights into the economic, social, political and environmental factors that shape	4	None			3	

					and inlfuence how people interact with their environment and the world they live in. Students also explore the concept of development by looking at the standard developmental indicators used to measure development, as well as to examine the efforts by different countries to bring about development. The course highlights the connection between economic globalisation and the sustainable development goals (SDGs), especially in terms of decent work and economic growth, and reduced inequalities.						
2	1	HY2131	Core	History Studies I	This course focuses on the history of Southeast Asia during the late 19th century, and students will explore the reasons and processes of European colonisation in Southeast Asia. The case studies of British Malaya and Dutch Indonesia will be examined. Students will also gain an understanding of the impact of colonisation on Southeast Asia as well as the legacy of European dominance.	2	HU1131			2	
3	1	HY3131	Core	History Studies III	This course examines the issues and conflicts during the Cold War era in Europe and its impact on the world order in the post 1945 years. It also covers problems and events leading to the collapse of communism in Eastern Europe and the Soviet Union. A. A New Era of International Relations 1. Outbreak and Developments of the Cold War 2. Escalation of the Cold War: The role of Science and Technology in Space Development and Arms Race, Vietnam War and Korean War 3. Effects of Cold War Conflicts on the World B. Weaknesses of the Command Economy and Communist System 1. Gorbachev's Reforms and his "New Thinking" 2. Reasons for the Collapse of Communism and Breakup of the Soviet Empire This course focuses on the decolonisation and emergence of nation-states in Southeast Asia. Two case-studies of Malaya and Vietnam/Indonesia will be used to examine key factors that shaped the differing pathways and influence the struggles for independence of the countries. An awareness of the countries' historical developments will provide students with a better understanding of present-day issues that are unique to the region. A. Decolonisation and emergence of Southeast Asia 1. Struggles for independence in Southeast Asia states in the post-WWII period B. Case study of Malaya 1. Re-establishment of British Rule and local responses 2. Establishment of independent Malaya C. Case study of Vietnam OR 1. Attempts by French to re-establish French rule and local responses 2. Reunification and establishment of independent Communist Vietnam D. Case study of Indonesia 1. Attempts by Dutch to re-establish Dutch rule and local responses 2. Establishment of independent Indonesia	3	HY2132			3	Year long course

4	1	HY4131	Core (Major)	History Insights I	THE DEVELOPMENT OF THE COLD WAR (1945 - 1991) In this course, students will study the Cold War which resulted from the USA and USSR emerging as ideologically opposed superpowers after the Second World War. These tensions, which largely began in Europe, extended to other parts of the world, where it interacted with forces such as nationalism and decolonisation to bring about profound changes. A. Emergence of the Cold War after the Second World War 1.Historical interpretations of the origins of the Cold War: traditional, revisionist, post-revisionist, post-Cold War 2. Causes for the emergence of tensions between USA and USSR 3. Manifestations of emerging tensions: Yalta and Potsdam conferences, Sovietisation of Eastern Europe, the Iron Curtain Speech, Kennan's Long Telegram, Truman, Doctrine, Marshall Plan, Berlin Blockade, NATO and Warsaw Pact B. Manifestations of the Global Cold War 1. Korean War (1950 - 1953) 2. Vietnam War (1959 - 1975) 3. Cuban Missile Crisis (1962) C. End of the Cold War 1. Historical interpretations of the end of the Cold War: Western triumphalist, Soviet initiative and "People Power" debates 2. USA's policy of renewed confrontation and containment 3. Decline of the USSR and shifts in Soviet foreign policy 4. Eastern European movements and revolutions in the 1980s: Poland and East Germany	4	None			3	
4	2	HY4132	Core (Major)	History Insights II	CONFLICT AND COOPERATION (1945 - 2000) In this course, students will examine selected key inter-state and intra-state conflicts that took place during the post-WW2 period. To mitigate the effects of these conflicts on international/regional peace and security, various actors that included the United Nations and ASEAN were involved in managing them. Students will evaluate the effectiveness of the approaches taken by to manage these conflicts. A. Collective Security Role of the UN 1. Traditional Peacekeeping 2. Complex Peacekeeping and Peacebuilding B. Inter-state Conflicts - Causes: decolonisation, security, territorial sovereignty, nationalism, religion, economic interests - Role of different actors: combatant states, the superpowers, the UN -Effectiveness of conflict management Case Studies: 1. Indo-Pakistani Conflict (1947 - 1972) 2. Arab-Israeli Conflict (1948 - 1979) C. Intra-state Conflicts - Causes: domestic politics, economic interests, ethnic and religious nationalism - Role of different actors: domestic state and non-state actors, major powers, the	4	None			3	

					UN - Effectiveness of conflict management Case Studies: 1. Congo Crisis (1960 - 1965) 2. Bosnian War (1992 - 1995) D. Inter-state Tensions/Conflicts in Southeast Asia - Formation, growth and development of ASEAN - Causes and consequences of tensions/conflicts Case Studies: 1. Third IndoChina War / Preah Vihear Dispute 2. South China Seas Dispute 3. Singapore-Malaysia Water Dispute / Pedra Branca Dispute (HI)						
5	1	HY5131	Core (Major)	History Insights III	FORMATION OF NATION-STATES AND ECONOMIC CHANGES IN SOUTHEAST ASIA (INDEPENDENCE - 2000) In this course, students will study how selected Southeast Asian countries formed nation-states after WW2. The process was characterised by different groups competing to shape political development. Efforts to form states were closely associated with the task of building nations to unite the different ethnic groups that lived within the territorial boundaries of the state - a legacy of colonial rule. Students will also study the economic change in Southeast Asia after WW2. Although some features of the pre-war economic landscape persisted, Southeast Asian economies experienced significant changes that were shaped by the respective governments' ability to harness opportunities and mitigate the challenges brought about by domestic and international developments. A. Establishing Political Structures and Legitimacy 1. Factors for establishment of different forms of government 2. Consolidation of power: role of government leaders, sources of power and legitimacy, political challenges and popular opposition, Cold War developments B. Pursuit of National Unity 1. Need for national unity and the challenges of ethnic separatism 2. Different approaches and outcomes of effort to build national unity C. Economic Change in Southeast Asia 1. Pursuit of economic growth, equity and nationalism 2. Changes and continuities within and across key sectors since independence 3. Factors shaping economic change 4. Outcomes of economic change	4	None			3	
5	2	HY5132	Core (Major)	History Insights IV	DEVELOPMENT OF THE GLOBAL ECONOMY (1945 - 2000) In this course, students will study the development of the global economy in the post-WW2 period. Economic challenges, such as forces of protectionism, accompanied the growth of the global economy had an increasingly global impact, with diverse outcomes for different countries. Situated within this changing global economy, the East Asian economies of post-war Japan and post-1978 China showcased how countries leveraged global economic changes to chart their own paths to economic development. A. Growth and Challenges in the Global Economy	4	None			3	

					1. Factors for the growth of the global economy - post-war economic reconstruction - role of USA, Western Europe and Japan - role of MNCs, international organisations and arrangements (Bretton Woods, World Bank, IMF) 2. Challenges in the Global Economy - 1973 and 1979 oil crises - Protectionism (GATT and WTO) - Debt crises of the 1980s B. Transformation of East Asian Economies 1. Japan (1947 - 1991) 2. China (1978 -200) 3. Hong Kong, South Korea and Taiwan (HI) C. Economic Cooperation in ASEAN 1. Effectiveness of ASEAN in promoting regional economic cooperation 2. Outcomes of ASEAN's efforts in promoting regional economic cooperation						
6	1 and 2	HY6131	Core (Major)	Research in History	RESEARCH IN HISTORY In this course, students will apply their understanding of how the past is constructed to conduct an individual inquiry into their chosen research history question. Students will identify an area of historical interest, examine a variety of evidence, and interpret and evaluate the evidence to reach informed conclusions. At the end of the independent research process, they will submit a 3500-word research essay based on a topic of their choice, which has to be approved in advance by the NUS High School Humanities Department. A. Research Proposal 1. Asking good questions for research in history 2. Developing a literature scan and understanding its relationship with a good research question B. Research 1. Devising a research methodology to answer the research question 2. Identifying repositories of resources relevant to the research question C. Writing 1. Analysing sources in relation to their historical setting 2. Assessing sources for validity, reliability, etc 3. Formulating an argument that answers the research question 4. Organising and structuring te argument 5. Referencing and citation D. Reflection 1. Managing bias in reading and selecting sources 2. Limitations of sources in constructing historical narratives 3. Contributions and limitations of the research in relation to the research in relation to the research question and topic	4	None			3	Year long course
6	2	HY6132	Core (Major)	History Insights V	HISTORY OF IDEAS This course focuses on the development of selected key ideas (from the "west") that underpin contemporary society. It revolves around the history of science and	4	None			3	

					political theory, and the history of history. Students will examine the origins and impact of the Scientific Revolution as well as the theory of evolution and their impact on society. They will examine the development of the modern traditions of liberalism and socialism that continue to dominate social-political debate today. Students will also be equipped with a theoretical understanding of the nature of history, and critically appraise how the past of is interpreted, portrayed and represented. A. History of Science and Society 1. The Scientific Revolution 2. Scientific Revolution and Faith 3. Evolution and Society B. History of Social and Political Thought in the 19th and 20th century 1. Social Construct Theory: Locke, Hobbes and Rousseau 2. British Liberalism 3. Marxism 4. Keynes and post-war consensus 5. Neoliberalism C: Investigating History 1. History as accounts of the past: empiricist history, history as an interpretation of the past, post-modernist history 2. How and why different historical accounts are constructed: history and national narratives, historical contexts that shaped the writing of history and historiographical developments 3. The nature of evidence in history: use of sources to construct historical knowledge						

Music

Welcome to the NUS High School Music Program

Music education in the NUS High School aims to refine the aesthetic sensitivities of all humanities. It is our mission to provide a quality music program that is an integral part of the entire education as well as a reflection of a well-balanced education experience. School and community resources are used to facilitate the exploration of music in a manner both meaningful and relevant to students. Students majoring in music—upon recommendation—will also enjoy the collaboration opportunities with higher institutions. The music program will enhance students' learning through the acquisition of

- Music Knowledge and Reading
- Music Listening and Analysis
- Music Composition and Performance

The music program will develop students in achieving these learning competencies and to strive for excellence within the limits of their individual capabilities in three areas: Skill Development, Musical Understanding, and Attitude Development.

Expected Requirements

Applied Instrument:
Students majoring in Music must try to attain at least a Grade 8 standard of the *Associated Board of Royal School of Music* (ABRSM) or beyond for the first musical instrument and a Grade 5 standard ABRSM for the second instrument by Year 6. Majoring students will study or continue to learn the applied instruments* with their external music teachers who will prepare them for examination boards such as the ABRSM or *Trinity College London* (TCL). Each level grows from those experiences previously presented.

**Please check with HOD for the approved applied instruments*

Performing Opportunities: Senior Recital and CCA Performing Arts:
Aside from fulfilling the applied instruments requirement, music majors are also required to:

- present a Senior Recital in Year 6
- participate in one of the CCA Performing Arts group: School Orchestra or Chinese Orchestra or Choir (based on their 1st instrument)

We hope to provide music majors the opportunities to explore in and out of school music activities and the study of an orchestra instrument during his or her high school education.

Design of Curriculum

Music curriculum is deliberately made flexible in order to meet the needs of students within a variety of facilities and school timetable structures. Students will gain an introduction to Music in Year 1. They will then have the option of pursuing Music in Years 2 and 3, as well as majoring in Music from Years 4 to 6. Each course represents a minimum of 12-15 weeks of classroom instruction per semester. Each unit is equivalent to 50 minutes of the class time. Some of the courses can be self-contained while others are taught in spiral sequence.

Students aiming to choose Music as a 4th major may do so by completing **all CORE music courses**. These **CORE Courses** offer students a broad-based exposure and a general overview of the subject so as to increase the students' general musical knowledge, the depth of understanding and appreciation of the subject matter. These courses lay a strong

foundation for the fundamental concepts and principles of music. Grades of Year 3 to 6 Core courses are counted toward the Grade Point Average (GPA).

We acknowledge that

1. the individual students will not necessarily be practitioners of the arts, few may choose it as a career,
2. still more may pursue it as an avocation, and
3. most of the students will be the mass audience for the culture of their times.

However, we want to foster in our students the appreciation and understanding of the arts so to allow them a lifelong source of enjoyment.

Assessment

The music program will explore various modes of assessment: ***Authentic*** (skill demonstration, performance-based and task-oriented); ***Formative*** (For learning: what new insights have students brought to their music making during this lesson or unit of work-carried out throughout a course or project—process); and ***Summative*** (Of learning—record the overall achievement of a student-end of a course or project—measures learning outcomes).

The assessment ranges from individual practical examinations to submitted projects and presentations–with emphasis on authentic assessments. Each course carries its own specific Continual Assessment (60%) requirement such as Quizzes/Tests, Assignment (in theory or in practical aspects), Projects, Concert Reports; and a Final Examination or Project (40%) or entirely 100% Continual Assessment.

Students experience both the reflective preparations and drafting and revision of work. At the other extreme, aside from learning to improvise, sight-read/sing, and generally 'think on their feet,' students are strongly encouraged to be assessed by external examination boards such as the ABRSM or Trinity for benchmarking purposes.

Learning Outcomes

The Music & Art Department promotes and cultivates awareness and appreciation through the Aesthetic Appreciation Program, nurtures passionate students through curriculum and department activities that contribute to the total development of the individual. This development enhances also the 21st century competencies and the MOE's Desired Outcomes (*Confident Person, Self-Directed Learner, Active Contributor, Concerned Citizen*). School and community resources are used to facilitate the exploration of music and art in a manner both meaningful and relevant to students. Majoring students would have attained the skills and knowledge that will prepare them for tertiary level education and beyond.

When students can relate and apply their **knowledge and ideas**, and are able to, **associate**, **apply**, **analyze** and **synthesize** through the learning processes for themselves, they are equipped with skills and competencies which will allow for lifelong learning to occur. In short, students will experience satisfying and valuable means to explore and develop their composite talents and abilities.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 or 2	MU1131	Core	Foundations in Music	The course introduces music in context with the world/environment we live in; and that music can be much more connected to subjects such as Math and Science. This inter-disciplinary approach seeks to re-visit the once natural coexistence of the subjects and uncover the similarities between them. Students create and perform music in both vocal and instrumental (percussion) settings, listen and respond to music of different timbre. The course also aims to provide a process-oriented and interactive platform for inquisition and play. By the end of the semester, students would have developed and cultivated aesthetic values in music so to allow lifelong learners.	2	Good Attitude and Open Mindset			2	
2	1	MU2131	Core	Basic Musicianship I	Basic Musicianship I looks into the essential elements of music reading, listening and performing. Students will be exposed to music notation and composing of simple melodies and rhythms; active listening through basic ear-training and sight-singing; and musical expressions through conducting and performing. By the end of the semester, the student would have developed and cultivated aesthetic values in music so that they have lasting appreciation of music and enjoyment of collaboration.	2	MU1131			2	
2	2	MU2132	Core	Basic Musicianship II	Students in Basic Musicianship II are exposed to the music heritage of Asian countries such as Singapore, Japan, China, India and Indonesia and its offshoots to today's musics of popular and trend. Students will also have creative opportunities to compose folk-tunes and collaborations through group performance. By the end of the semester, the student would have listened with a purpose to music, built up an increased aural awareness of what musical sounds are being heard; and a changed attitude in which they value music of different cultures.	2	MU2131			2	
3	1	MU3131	Core	Music: The Extravagant Art	This course looks into a tighter and more logical aspect of listening and appreciation — through the various eras and genres (symphony, opera, chamber, concertos, and other forms of music today) — relating them to the arts, society and nationalities. This course will also introduce the contents of various works and their aesthetic qualities: what goes on in the music and how it affects us. Listening to music itself is an art and critical listening constitutes an active and creative experience. The highly sensuous pleasure we experience while listening to music is our emotional reward for an intellectual effort well made. By the end of the semester, the student would be able to LISTEN intelligently with a purpose and an increased aural awareness of musical sounds. They will also be able to describe and explain the organization and expression of musical styles; make comparison to a given type of music.	3	MU2132			3	
3	2	MU3132	Core	Elements of Music Theory	This course spirals to the next level of music theory for students who have already attained ABRSM Grade 3 / 4 Music Theory or have completed Basic Musicianship. It covers the basic form and analysis of music, various	3	MU3131			3	

					clefs, irregular time signatures, usage of triads and chords in harmonization, basic compositional devices, ornaments, instruments of the orchestra, transposition and arrangement, etc. Majoring students (without the earned certificate) must sit for the external examination: ABRSM Grade 5 Music Theory.						
4	1	MU4131	Core (Major)	Ear-Training & Sight-Singing	This course challenges students to the task of ear-training and sight-singing exercises designed to build up an increased aural/oral awareness of musical sounds and pitching. The exercises consist of study and practice in melodic (2—3 parts), harmonic (2–4 parts) and rhythmic (simple to irregular) drills and dictations, identifying intervals (simple to compound), types of scales (e.g. modes, chromatics blues scales), triads and chords, keyboard harmony, score reading in various clefs (treble, alto, tenor, bass), conducting skills—ALL within a tonal/atonal context, error detection, prepared/unprepared singing and dictation. Students will be required to sing as an ensemble (virtual and onsite) in various parts.	4	MU3132			3	Refer to criteria checklist for eligibility to major
4	2	MU4132	Core (Major)	Chamber Music	Chamber Music is defined as music for small ensembles, one performer to a part, generally without a conductor. In the past, the term chamber music was restricted to Western classical music for small ensembles, such as the string quartet or piano quintet. However in NUS High School, chamber music may comprise of different musical styles and mix of available instrumentations and skills. At the heart of this art form is a spirit of collaboration. Democratic in essence, chamber music demands that each individual engage in a close musical dialogue with the other performers. Their collective musical instinct, experience, knowledge, and talent guide the process of interpreting, rehearsing, and performing. Students are required to present a performance - consisting of instrumental playing and singing (optional acting and dancing).	4	MU4131			3	
5	1	MU5131	Core (Major)	Melody & Harmony	This course deals with tonal organization in the music of the 18th and 19th centuries, offers a thorough and comprehensive course of study in harmony, figured bass, forms and analysis, melodic decorations, suspension, writing for orchestral instruments, modulation, suspension, diatonic secondary 7th chords, Neapolitan 6th chord, Diminished 7th, Augmented 6th, advanced studies in four-parts, modulation, instrumental styles writing, harmonizing a melody, rewriting chorale passage and sonata, continuation of melodic writing for 2 treble instruments and a basso continuo, identification of compositions, its different genres and styles etc. Majoring students without the certificate are strongly encouraged to sit for the external examination: ABRSM Grade 8 Music Theory.	4	MU4132			3	Students must have attained a certificate of ABRSM Grade 5 Music Theory. (Merit & above)
5	2	MU5132	Core (Major)	Orchestration & Music Composition	This course looks into the principles of composition and instrumentations; and aims to develop student's inventive ability with guided writings in various forms of musical composition. Two parts: (1) *Instrumentation* deals with the ranges, techniques, and timbres of each of the orchestra instruments; (2) *Orchestration* deals with major scoring problems as well as techniques of transcribing piano, chamber, band music for orchestra,	4	MU5131			3	Students must have attained at least a B+ for MU5131 or an equivalent standard of ABRSM Grade 8 Music Theory

					and explores the ranges and transpositions of voices. Students will work on these characteristics and basic techniques in arranging, transcribing and scoring for chorus, orchestra, band and ensembles from pre-existing scores to original compositions. Students will be equipped with music technology skills where they learn music notation software (e.g. Finale) and basic knowledge of MIDI sequencing (garage band) to create and compose music.						
6	1	MU6131	Core (Major)	Performance Practice	Performing Practice is about the performance of music—stylistically and technical aspects – of how the music should be performed in corresponding to the eras (Baroque, Classical, Romantic, Contemporary). This course looks not only the performance styles but also into the notated/written scores - techniques of embellishments & ornamentations; tradition & philosophy, cultural perspectives – which values respect and represents our culturally diverse population. The course also focuses on the fundamental issues that will affect the teaching and learning of music - functions of music education to its social, psychological and pedagogical aspects. More practical topics discussed are cultural pluralism, innovative approaches in teaching & learning and critical thinking. Students are required to submit a research paper on a topic of their choice (a proposal of no more than 500 words must be submitted for approval) which draws from areas of study such as analytical studies of various perspectives and approaches through representative recordings of literature and multimedia to performance or composition studies.	4	MU5132			3	
6	2	MU6132	Core (Major)	Senior Recital	Music performance is an integral part of every student's music education. As such, students specializing in music are required to perform a full recital of 45-50 minutes in the final year of NUS High music education: primary instrument (35 minutes) and secondary instrument (10 minutes). Students are to adhere to the recital guidelines. Prior to the recital, majoring students are to fulfill the followings: attained a minimum standard of ABRSM Grade 8 for the first musical instrument and a minimum standard of ABRSM Grade 5 for the second instrument, participated in a music competition – be it ensemble/ solo (optional), played for at least one master-class, presented at least 2 mini-performances for experience (solo or joined and a lecture recital), and passed the jury a month prior to the recital. Majoring students are required to check with the Department Head on the procedures and bookings, recital repertoires; and the after recital reception (optional) with their parents.	4	MU6131			3	Students must have attained a minimum standard of ABRSM Grade 8 or equivalent for the 1st musical instrument and ABRSM Grade 5 or equivalent for the 2nd instrument.

Art

Welcome to the NUS High School Art Program

The Art program in NUS High School aims to cultivate the student's interest and curiosity in fields of art study. Students can put into practice what they have learnt in the Math and Science courses to enhance their holistic learning within the art classroom: Geometry in perspective drawing, Chemistry in ceramics, Physics in sculpture, Biology in figure drawing and environmental sculptures, Psychology in interactive art and computer technology in new media arts. Art can also be used as a neutral ground when talking about social or controversial subjects. The program will enhance students' learning through:

- **Aesthetic Perception**: Students will learn to perceive the aesthetic value in nature and will be able to articulate with a language specific to the visual arts in their immediate surroundings.
- **Artistic Expression**: Through the process of art making, students will learn to express themselves and the art of visual communication through various forms.
- **Historical and Cultural Context**: Students will understand historic contributions and cultural context in the visual arts. They will analyze the role of visual art in the development of human cultures all around the world.
- **Critical Analysis:** Students will learn to analyze aesthetic principles and verbalize their understanding of the issues through constructive criticism of other students' work.
- **Practical Applications**: Students will apply creative skills in problem solving, communication and organization of resources and time. They will also learn aesthetic appreciation, expression through visual language and will experience first-hand the process of cross-disciplinary interaction. These abilities will help students understand how the arts are applied in everyday life and what careers are related to the visual arts.

Four Aspects of Visual Arts Education

- **2 Dimensional (2D) studies**: include Drawing, Painting, Printmaking, Photography, Textiles, Collage and Illustration
- **3 Dimensional (3D) studies**: Sculpture, Ceramics, Multi-media work and Installation Art.
- **Design:** Fashion Design, Jewelry Design, Product Design, Interior and Furniture Design.
- **Art History**: infused into the 2D, 3D and Design courses. It aims to cultivate the understanding and knowledge of architecture, sculpture, painting, and other art forms within diverse historical and cultural contexts.

Students will gain an introduction to Art in Year 1. They will then have the option of pursuing Art in Years 2 and 3, as well as majoring in Art from Years 4 to 6. Students aiming to choose Art as a 4th major may do so by completing all CORE art courses. These CORE courses offer students a broad-based exposure and a general overview of the subject so as to increase the students' general musical knowledge, the depth of understanding and appreciation of the subject matter. These courses lay a strong foundation and the fundamental concepts and principles of the subject. Core course grades are counted toward the Grade Point Average (GPA).

Expected Requirements

Majoring students are required to

1. submit for AP Studio Art (2D-Design or Drawing portfolio)
2. present an Art Grad Show by Year 6
3. join Media Club – photo/AV (if that's their strength and Medium for Art) or one of the performing arts and/or Music & Art Ambassadors (objective is to ensure Team Collaboration).

Students aiming to choose Art as a 4th major may do so by completing all CORE art courses. These CORE courses offer students a broad-based exposure and a general overview of the subject. Core course grades are counted toward the Grade Point Average (GPA). Majoring students will work on building a portfolio in one of two portfolio areas: 2-D Design or Drawing. Students will have to consult the subject teacher to decide on a suitable area to focus on. The portfolio should reflect three areas of concern: (1) a sense of quality in a student's work; (2) the student's concentration on a particular visual interest or problem; (3) the student's need for breadth of experience in the formal, technical, and expressive means of the artist. Students majoring in Art will be equipped with the skills and knowledge to submit an AP Studio Art Portfolio in Year 6 of their studies.

Learning Outcomes

The Music & Art Department promotes and cultivates awareness and appreciation through the Aesthetic Appreciation Program, nurtures passionate students through curriculum and department activities that contribute to the total development of the individual. This development enhances also the 21st century competencies and the MOE's Desired Outcomes (*Confident Person, Self-Directed Learner, Active Contributor, Concerned Citizen*). School and community resources are used to facilitate the exploration of music and art in a manner both meaningful and relevant to students. Majoring students would have attained the skills and knowledge that will prepare them for tertiary level education and beyond.

When students can relate and apply their **knowledge and ideas**, and are able to, **associate**, **apply**, **analyze** and **synthesize** through the learning processes for themselves, they are equipped with skills and competencies which will allow for lifelong learning to occur. In short, students will experience satisfying and valuable means to explore and develop their composite talents and abilities.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 or 2	AR1131	Core	Foundations in Art I	Foundations in Art I invites students to discover art as a creative lens and investigative tool to understand the world and environment we live in. Through this inter-disciplinary approach, the deeper connection and natural coexistence of art and other subjects, such as Math and Science, are uncovered. The course also aims to provide a process-oriented and interactive platform for inquisition and play. Students will learn relevant and significant art terms and art history to support the understanding of the course.	2	Good Attitude and Open Mindset			2	
2	1	AR2131	Core	Foundations in Art IIA	Foundations in Art IIA introduces art fundamentals in theory and practice. Students will learn and apply the elements of art in a variety of ways to create unique and diverse works of art in different mediums. Concurrently, they acquire essential knowledge of the terminology to facilitate the contextual appreciation and description of art. The course also aims to provide students with an environment for inquiry, imagination and self-expression through discussion and artmaking.	2	AR1131			2	
2	2	AR2132	Core	Foundations in Art IIB	Foundations in Art IIB delves deeper into the art fundamentals in theory and practice. Students will learn and apply the principles of art in a variety of ways to create unique and diverse works of art in different mediums. Concurrently, they acquire essential knowledge of the terminology to facilitate the contextual description and analysis of art. The course also aims to provide students with an environment for inquiry, imagination and self-expression through discussion and artmaking.	2	AR2131			2	
3	1	AR3131	Core	Art Intermediate I	Art Intermediate I embarks students on a creative practice of art and design while incorporating influences from relevant art history, theories and movements. To develop their skills, artmaking techniques in both 2D and mixed media will equip students with visual strategies to create innovative representations through problem-solving and creative thinking. Students will begin to build a portfolio based on their explorations and practice in this course. The course also aims to provide students with an environment to sharpen their critical thinking and communication skills through using Feldman's Model of Art Criticism, namely: Describe, Analyze, Interpret and Evaluate (DAIE).	3	AR2132			3	
3	2	AR3132	Core	Art Intermediate II	Art Intermediate II delves deeper into the creative practice and process of art and design by using a variety of methods while incorporating influences from relevant art history, theories and movements. To further develop their skills, artmaking techniques across the spectrum of art in 2D, 3D and mixed media will challenge students in visual conception and representations through project-based learning and creative thinking. Students will continue to build on the portfolio based on their explorations and practice in this course. The course also aims to provide students with an environment to sharpen their critical thinking and communication skills through using Feldman's Model of Art Criticism, namely: Describe, Analyze, Interpret and Evaluate (DAIE).	3	AR3131			3	
3	1 and 2	AR3331	Enrichment	Ceramictivity	Discover the art of shaping clay with your hand. You will learn techniques such as slab rolling, coil construction with an introduction to the slab roller and other ceramics tools. This enrichment will focus on the fundamentals of hand building, from creating a piece to glazing and firing it. Ceramictivity is not just about creating art; it's about expressing yourself through the tactile and therapeutic process of working with clay. This course promises to be a rejuvenating experience that allows you to tap into your	2	No prior experience is required - just bring your enthusiasm			2	8 weeks course

					creativity and explore the limitless possibilities of ceramic art. By the end of the course, students would have been able to: • develop and cultivate aesthetic values in art so to allow lifelong learners. • acquire self-awareness and apply self-management skills to achieve personal well-being and effectiveness. • acquire social awareness and apply interpersonal skills to build and maintain positive relationships based on mutual respect.		and a willingness to learn!				
4	1	AR4131	Core (Major)	Art Advanced I	Art Advanced I provides students the scope to advance their skills in 2D and mixed media via practice, explorations and the study of art history. Students will concentrate on a particular area of investigation during artmaking to generate a repertoire of works forming their portfolio. The Feldman's model of art criticism is reinforced with an in-depth use of art terminologies as relevant tools in communicating and writing for art. Through intensified theory and studio practice, students are equipped with critical & creative thinking skills and visual strategies to inform their formal and technical approaches.	4	AR3132			3	Refer to criteria checklist for eligibility to major
4	2	AR4132	Core (Major)	Art Advanced II	Students in Art Advanced II continue to delve deeper in their understanding & application of art and design principles to build up a repertoire of 2D and mixed media works through practice, explorations and the study of art history. Authentic assignments by means of the visual art task and art showcase are introduced to the course. The Feldman's model of art criticism is reinforced with an in-depth use of art terminologies as relevant tools in communicating and writing for art. Through intensified theory and studio practice, students are equipped with critical & creative thinking skills and visual strategies to inform their formal and technical approaches.	4	AR4131			3	
5	1	AR5131	Core (Major)	Studio Art I	Studio Art I develops the portfolio into one of two portfolio types: 2-D Design or Drawing, as part of their studio practice. Students refining the portfolio should reflect three areas of concern: (1) a sense of quality in the art work; (2) concentration on a particular visual interest or problem; (3) the need for breadth of experience in the formal, technical, and expressive means of the artist. The theory component introduces students to significant art-making approaches from the pre-modern to contemporary eras using the Feldman's model of criticism as a tool in communicating and writing for art. Overall, the course enables students to execute creative thinking strategies with more confidence and hone their critical thinking skills with focused practice and application.	4	AR4132			3	
5	2	AR5132	Core (Major)	Studio Art II	Studio Art II, an extension of Studio Art I, further develops the portfolio into one of two types: 2-D Design or Drawing. Students refining the portfolio should reflect three areas of concern: (1) a sense of quality in the art work; (2) concentration on a particular visual interest or problem; (3) the need for breadth of experience in the formal, technical, and expressive means of artist. The theory component deepens students' understanding of significant art-making approaches from the pre-modern to contemporary eras; and trains them to evaluate the evolution of the visual image through aesthetic theories using the Feldman's model of criticism as a tool in communicating and writing for art. Overall, the course enables students to execute creative thinking strategies with more confidence and hone their critical thinking skills with focused practice and application.	4	AR5131			3	

6	1	AR6131	Core (Major)	Studio Art III	Studio Art III consolidates the portfolio for submission to and evaluation by an external examination board in one of two types: 2-D Design or Drawing, as part of studio practice. Students finalizing the portfolio will ensure these areas of concern are met: (1) a sense of quality in the art work; (2) concentration on a particular visual interest or problem; (3) the need for breadth of experience in the formal, technical, and expressive means of the artist. Students are also required to write a research on a topic of their choice, relating to art matters, supported with a relevant theoretical framework.	4	AR5132			3	
6	2	AR6132	Core (Major)	Art Grad Show	The Art Graduation Show is a culmination of the student's artistic learning journey in NUS High School. It entails the rigorous process of planning, conceptualizing and curating for an art exhibition. Students will exhibit their past and current artworks collectively and thematically in the school premise. The course also requires the students to present their oeuvre of art works to a panel of judges consisting of two art teachers and an external assessor.	4	AR6131			3	

Da Vinci

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.

The 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; and to exchange ideas through oral and poster presentations at local and overseas science fairs and conferences.

All Da Vinci Programme Courses will be awarded *Distinction, Merit, Pass* or *Unclassified* according to performance (no Grade Points are given).

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 or 2	DV1132	Core	Design & Engineering	This semester-long course aims to give students the intermediate skills they need to turn their ideas into reality. This course will build on the skills taught in DV1131. Students will learn to work with wood and plastics, as well as basic electronics. They will also be introduced to computer-aided design software	0	None			2	
1	1 or 2	DV1133	Core	Science Presentations	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 the general public. This course 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 facts from each other. Students will also be encouraged to ask and think about critical questions pertaining to the research process.	0	None			2	
2	1 and 2	DV2134	Core	Junior Maker	In this course, students will learn to code and control hardware using an Arduino board. In this way, they will be introduced to the basics of using the inputs from sensors and other devices to control output devices to achieve a given objective. Students will get a rich hands-on experience and will need to complete a simple project.	0	None			3	Students will take eithter DV2134, DV2135 or DV2136 in Year 2
2	1 and 2	DV2135	Core	Junior Science Research	In this course, students will be taught the scientific method, its merits and limitations and how to systematically make enquiry into science. Students will propose a research topic of their own choice which will be reviewed and approved by their teachers. They will design, structure and carry out the project in small teams and deliver a report and presentation at the end of their project.	0	None			3	Students will take eithter DV2134, DV2135 or DV2136 in Year 2
2	1 and 2	DV2136	Core	Junior Math Research	In this course, students will be taught mathematics problem-solving skills and how to apply them in a mathematics project. Students are also taught the use of LaTeX to produce professional looking reports. Students will propose a research topic of their own choice which will be reviewed and approved by their teachers. They will design, structure and carry out the project in small teams and deliver a report and presentation at the end of their project.	0	None			3	Students will take eithter DV2134, DV2135 or DV2136 in Year 2
3	1 or 2	DV3131	Core	Research Methodology	Research is an integral component of science and mathematics. It is the vehicle for the advancement of these disciplines, both past and present. Thus, having a good understanding of various components of research and possessing good research skills will put one in a good stead for a career in math and science. In this course, we aim to introduce the basic framework which scientists and mathematicians follow to conduct their research work, i.e. the principles behind elucidating valid research findings, as well as the processes, skills and ethics needed to conduct, evaluate and communicate research well.	0	None			3	[†] Students will take DV3131 either in Semester 1 or 2.
3 or 4	1	DV3231	Elective	Advanced Design and Engineering	This elective course aims to extend students' understanding of the 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 course will teach advanced skills that will enable the	0	DV2131			1.5	

					student to design and implement customized automation and data acquisition solutions to meet research and engineering goals.						
3 or 4	2	DV3232	Elective	Innovation and Enterprise	This course will focus on the conceptualisation, design and development of technology orientated products and services. Students will learn about innovation, design thinking, and marketing. Students will have to work in groups to identify a problem, identify customer needs, establish product/service specifications, then design, plan and prototype a product. Students will need to be able to work in teams, be comfortable with presentations, and have a strong interest in design and innovation. There can also be guest lectures by entrepreneurs and founders of various start-ups. The course will also cover intellectual property and financial analysis.	0	None			1.5	
3 or 4	2	DV3233	Elective	Innovation and Enterprise for Community Projects	NUS High aims to develop our students into world-ready pioneers, humanitarians and innovators with the skills and mindset to make a positive contribution to humanity. We strive for some of our students to become future-ready start-up founders and corporate innovators who will be able to operate effectively in a dynamic global business landscape. This course had a specific focus on teaching students to understand and provide for the needs of people with disabilities. Students were encouraged to apply the design thinking process to solve community challenges.	0	None			2	
3 or 4	1	DV3234	Elective	Overseas Technopreneurship Learning Journey	NUS High aims to develop our students into world-ready pioneers, humanitarians and innovators with the skills and mindset to make a positive contribution to humanity. We strive for some of our students to become future-ready start-up founders and corporate innovators who will be able to operate effectively in a dynamic global business landscape. This learning journey will provide an overview of the innovation/startup landscape in the Asia-Pacific region. The course includes visits to start ups in Asian countries to learn about the start-up scene. In particular, we hope our students can be more aware of the innovation opportunities in Asian countries at various stages of economic development.	0	None			2	
3 or 4	1	DV3235	Elective	Digital Electronics	In this course on digital electronics and logic design with VHDL, students will learn the digital electronics concepts from scratch and also learn VHDL programming concepts to design digital circuits by writing the programs in textual form mapped into digital with this front-end language of VHDL. VHDL stands for VHSIC Hardware Description Language. In turn, VHSIC stands for Very-High-Speed Integrated Circuit	0	None			2	
4, 5 and 6	1 and 2	IP	Core	Research/Innovation Project	All students are required to complete and pass at least one Research or Innovation Project in the field of Math, Science or Engineering as an individual or in a team. Projects in other quantitative fields like economics may also be allowed. These projects may be linked to external programmes like the Science Mentorship Programme, Nanyang Research Programme, or the Young Defence Scientists' Programme. Students can do these projects internally or at an external research organization. Students can also do more than one project if they have the passion and aptitude.	0	DV3131			0	*Research Projects are not assigned a course code but will be reflected in the student's research transcript

General Curriculum

NUS High School aims to nurture students who are exceptionally gifted and passionate in math and science into future-ready pioneers, humanitarians and innovators. The bespoke curriculum is intentionally designed to provide a well-rounded education such that our graduates do not just have a quality of mind of a specialist with deep domain understanding, but also become an erudite polymath who is unfazed by unfamiliar knowledge and skills.

The General Curriculum complements the subject-specific academic courses required for the specialisation in a particular discipline. It imbues the students with lifelong learning skills, competencies and mindsets via an inter-disciplinary curriculum. It seeks to impart the capacity to think and reflect deeply, ask critical questions, make logical inferences and continue engaging in inquiry beyond the graduate's domain of expertise.

Level	Sem	Course Code	Course Type	Course Title	Description	Unit	Pre-requisites	Preclusions	Co-requisites	Hrs/ wk	Remarks
1	1 and 2	GC1331	Enrichment	Wonderment Exploration I	This enrichment course sparks curiosity by empowering students to delve into their interests, plan their own learning journey, and apply it effectively. They begin by submitting proposals for review and refinement, and then embark on self-directed learning during the final week of Semester 2, with the flexibility to continue into the school holiday. Upon completion, students showcase their learning accomplishments for evaluation. The course fosters self-discipline and the acquisition of skills and knowledge that go beyond the school's main curriculum.	2	None				Course grade will be given in the following year
2	1 and 2	GC2331	Enrichment	Wonderment Exploration II	Building upon previous wonderment learning, this enrichment course offers students the opportunity to either expand their knowledge in the same area or venture into entirely new subjects of interest. Following proposal approval, students have the chance to refine and adjust their plans before embarking on self-directed independent learning or activities. Upon successful completion, students present their achievements for assessment. The primary goal of this course is to nurture ongoing enthusiasm for acquiring valuable skills and knowledge beyond the school's core curriculum.	2	None				Course grade will be given in the following year
3	1 and 2	GC3331	Enrichment	Wonderment Exploration III	As the concluding chapter of the Junior High wonderment learning series, this enrichment course empowers students to either delve deeper into the previous subject or embark on an entirely new field. Following proposal approval, students are provided with the opportunity to fine-tune their plans before embarking on self-directed, independent learning, which can extend into school holidays if desired. Upon successfully concluding their project, students showcase their accomplishments for assessment. The main objective of this course is to foster ongoing exploration and maintain students' curiosity and enthusiasm for content beyond the school's core curriculum.	2	None				Course grade will be given in the following year

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