# iSTEM – 100-hour sample scope and sequence

This example is provided as a guide only. Schools will operate their department approved electives based on school and students’ needs and local context.

Table 1 – iSTEM 100-hour scope and sequence

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| --- | --- | --- | --- |
| Topic | Timing | Outcomes | Assessment |
| STEM fundamentals25 hours | Term 110 weeks | ST5-1, ST5-2, ST5-3, ST5-4, ST5-5, ST5-6, ST6-7, ST5-8, ST5-9, ST5-10 | **Week 10** – Task 1 practical tasks and portfolio |
| Computer-aided design25 hours | Term 210 weeks | ST5-1, ST5-2, ST5-4, ST5-5, ST5-6, ST5-8, ST5-10 | **Week 6** – Task 2 practical task |
| Aeronautical engineering25 hours | Term 310 weeks | ST5-1, ST5-2, ST5-3, ST5-4, ST5-5, ST5-6, ST6-7, ST5-8, ST5-9, ST5-10 | **Week 10** – Task 3 practical task and portfolio |
| STEM project-based learning25 hours | Term 410 weeks | ST5-1, ST5-2, ST5-3, ST5-4, ST5-5, ST5-6, ST6-7, ST5-8, ST5-9, ST5-10 | **Week 6** – Task 4 project portfolio |

## Additional information

Please complete the following [feedback form](https://forms.office.com/Pages/ResponsePage.aspx?id=muagBYpBwUecJZOHJhv5kbKo2q_ZUXlHndJMnh2Wd8NUOUk0VTIzUDVVSlVFQVM5MkdOMkJGTjVKNCQlQCN0PWcu) to help us improve our resources and support.

The information below can be used to support teachers when using the sample scope and sequence for iSTEM.

### Rationale

Australian businesses competing in a global economy will need more employees trained in science, technology, engineering, and mathematics (STEM). Research indicates that 75% of the fastest-growing occupations require STEM skills. Global accounting firm PwC (formerly known as PricewaterhouseCoopers) produced a report titled [‘A smart move’](https://www.pwc.com.au/publications/a-smart-move.html) where it found that shifting just 1% of the Australian workforce into STEM roles would add $57.4 billion to the gross domestic product (GDP) (net present value over 20 years).

iSTEM is a student-centred Stage 5 elective course that delivers science, technology, engineering, and mathematics education in an interdisciplinary, innovative, and integrated fashion. It was developed in direct response to industry’s urgent demand for young people skilled in science, technology, engineering, and mathematics.

The course was developed in collaboration with, and is supported by, industry, business, government, and universities, ensuring that students develop future-focused STEM skills. The course has a number of specialised topics, many of which are aligned with NSW State Government priority industries, identified in the [NSW Industry Development Framework](https://www.investment.nsw.gov.au/living-working-and-business/nsw-industry-development-framework/).

iSTEM develops enabling skills and knowledge that increasingly underpin many professions and trades, and the skills of a technologically enabled workforce. It provides students with learning opportunities to develop knowledge and skills to use the most up-to-date technologies including additive manufacturing (3D printing), laser cutters, augmented and virtual reality, drones, smart robotics and automation systems, artificial intelligence (AI), and a range of digital systems.

Students gain and apply knowledge, deepen their understanding, and develop collaborative, creative and critical thinking skills within authentic, real-world contexts. The course uses inquiry, problem and project-based learning approaches to solve problems and produce practical solutions utilising engineering design processes.

iSTEM is aligned to the concept of ‘[Industry 4.0](https://www.weforum.org/agenda/2019/01/why-companies-should-strive-for-industry-4-0/)’ which refers to a new and emerging phase in the industrial revolution that heavily focuses on interconnectivity, automation, machine learning, and real-time data.

iSTEM has been developed to meet the goals of National Federation Reform Council (NFRC) Education Council’s [National STEM School Education Strategy (2016-2026)](https://www.dese.gov.au/education-ministers-meeting/resources/national-stem-school-education-strategy), and supports the NSW Government’s [NSW Industry Development Framework](https://www.investment.nsw.gov.au/living-working-and-business/nsw-industry-development-framework/), the NSW Department of Education’s [Rural and Remote Education Strategy (2021-2024)](https://education.nsw.gov.au/about-us/strategies-and-reports/rural-and-remote-education-strategy-2021-24) and the [High Potential and Gifted Education policy](https://education.nsw.gov.au/policy-library/policies/pd-2004-0051).

### Aim

The aim of the course is to engage and encourage student interest and skills in STEM, appreciate the scope, impact and pathways into STEM careers, and learn how to work collaboratively, entrepreneurially, and innovatively to solve real-world problems.

### Purpose and audience

This resource is for teachers and leaders to provide examples of how outcomes can be mapped across the course. It also provides suggested patterns for assessment of learning at key stages in the course and models a possible sequence for core and option modules.

### When and how to use this document

Use this document when designing a pattern of study for students to achieve course outcomes. The timing and combination of outcomes and assessment can be tailored to meet the needs of students in different contexts.

### Differentiation

Differentiated learning can be enabled by differentiating the teaching approach to content, process, product and the learning environment. For more information on differentiation go to [Differentiating learning](https://education.nsw.gov.au/teaching-and-learning/professional-learning/teacher-quality-and-accreditation/strong-start-great-teachers/refining-practice/differentiating-learning) and [Differentiation](https://education.nsw.gov.au/campaigns/inclusive-practice-hub/primary-school/teaching-strategies/differentiation).

When using these resources in the classroom, it is important for teachers to consider the needs of all students in their class, including:

* **Aboriginal and Torres Strait Islander students**. Targeted [strategies](https://education.nsw.gov.au/teaching-and-learning/aec/aboriginal-education-in-nsw-public-schools) can be used to achieve outcomes for Aboriginal students in K-12 and increase knowledge and understanding of Aboriginal histories and cultures. Teachers should utilise students’ Personalised Learning Pathways to support individual student needs and goals.
* **EAL/D learners**. EAL/D learners will require explicit English language support and scaffolding, informed by the [EAL/D enhanced teaching and learning cycle](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/resources-for-schools/eald/enhanced-teaching-and-learning-cycle) and the student’s phase on the [EAL/D Learning Progression](https://education.nsw.gov.au/teaching-and-learning/curriculum/multicultural-education/english-as-an-additional-language-or-dialect/planning-eald-support/english-language-proficiency). In addition, teachers can access information about [supporting EAL/D learners](https://education.nsw.gov.au/teaching-and-learning/curriculum/multicultural-education/english-as-an-additional-language-or-dialect/planning-eald-support/english-language-proficiency) and [literacy and numeracy support specific to EAL/D learners](https://education.nsw.gov.au/teaching-and-learning/curriculum/literacy-and-numeracy/resources-for-schools/eald).
* **Students with additional learning needs**. Learning adjustments enable students with disability and additional learning and support needs to access syllabus outcomes and content on the same basis as their peers. Teachers can use a range of [adjustments](https://education.nsw.gov.au/teaching-and-learning/disability-learning-and-support/personalised-support-for-learning/adjustments-to-teaching-and-learning) to ensure a personalised approach to student learning. In addition, the [Universal Design for Learning planning tool](https://education.nsw.gov.au/teaching-and-learning/learning-from-home/teaching-at-home/teaching-and-learning-resources/universal-design-for-learning) can be used to support the diverse learning needs of students using inclusive teaching and learning strategies. Subject specific curriculum considerations can be found on the [Inclusive Practice hub](https://education.nsw.gov.au/campaigns/inclusive-practice-hub/primary-school/teaching-strategies/differentiation).
* **High potential and gifted learners**. [Assessing and identifying high potential and gifted learners](https://education.nsw.gov.au/teaching-and-learning/high-potential-and-gifted-education/supporting-educators/assess-and-identify#Assessment1) will help teachers decide which students may benefit from extension and additional challenge. [Effective strategies and contributors to achievement](https://education.nsw.gov.au/teaching-and-learning/high-potential-and-gifted-education/supporting-educators/evaluate) for high potential and gifted learners help teachers to identify and target areas for growth and improvement. In addition, the [Differentiation Adjustment Tool](https://education.nsw.gov.au/teaching-and-learning/high-potential-and-gifted-education/supporting-educators/implement/differentiation-adjustment-strategies) can be used to support the specific learning needs of high potential and gifted students. The [High Potential and Gifted Education Professional Learning and Resource Hub](https://schoolsnsw.sharepoint.com/sites/HPGEHub/SitePages/Home.aspx) supports school leaders and teachers to effectively implement the High Potential and Gifted Education Policy in their unique contexts.

All students need to be challenged and engaged to develop their potential fully. A culture of high expectations needs to be supported by strategies that both challenge and support student learning needs, such as through appropriate curriculum differentiation.

### About this resource

All curriculum resources are prepared through a rigorous process. Resources are periodically reviewed as part of our ongoing evaluation plan to ensure currency, relevance and effectiveness. For additional support or advice contact the Teaching and Learning Curriculum team by emailing secondaryteachingandlearning@det.nsw.edu.au.

**Alignment to system priorities and/or needs**: This resource aligns to the School Excellence Framework elements of curriculum (curriculum provision) and effective classroom practice (lesson planning, explicit teaching).

This resource supports teachers to address [Australian Professional Teaching Standards](https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/meeting-requirements/the-standards/proficient-teacher) 2.2.2, 2.3.2, 3.2.2, 7.2.2

This resource has been designed to support schools with successful implementation of new curriculum, specifically the NSW Department of Education approved elective course, iSTEM © 2021 NSW Department of Education for and on behalf of the Crown in right of the State of New South Wales.

The resource is produced to assist schools with promoting and implementing the course for the first time. As the course may be taught by teachers from a range of key learning areas, the resource is designed to support teachers from a variety of KLA expertise.

**Department approved elective course**: iSTEM

**Course outcomes**: ST5-1, ST5-2, ST5-3, ST5-4, ST5-5, ST5-6, ST5-7, ST5-8, ST5-9, ST5-10

**Author**: Curriculum Secondary Learners

**Publisher**: State of NSW, Department of Education

**Resource**: Scope and sequence

**Related resources**: Further resources to support iSTEM can be found on the department approved elective courses webpage including course document, sample scope and sequences, assessment materials and other learning sequences.

**Professional Learning**: Join the [Teaching and Learning 7-12 statewide staffroom](https://education.nsw.gov.au/teaching-and-learning/curriculum/statewide-staffrooms) for information regarding professional learning opportunities.

**Universal Design for Learning Tool**: [Universal Design for Learning planning tool](https://education.nsw.gov.au/teaching-and-learning/learning-from-home/teaching-at-home/teaching-and-learning-resources/universal-design-for-learning). Support the diverse learning needs of students using inclusive teaching and learning strategies.

**Consulted with**: Aboriginal Outcomes and Partnerships, Inclusion and Wellbeing, and EAL/D

**Reviewed by**: This resource was reviewed by Curriculum Secondary Learners and by subject matter experts in schools to ensure accuracy of content.

**Creation date**: 19th October 2021

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**Evidence Base**:

The long-term vision is for a curriculum that supports teachers to nurture wonder, ignite passion and provide every young person with knowledge, skills and attributes that will help prepare them for a lifetime of learning, meaningful adult employment and effective future citizenship (NESA 2020:xi).

NESA registration process for the NSW government schooling system indicates ‘the scope and sequence of learning/units of work mapped against the content and outcomes.’ (NESA 2021a:11) To maintain a consistent approach, department approved electives need to maintain this approach. The sample scope and sequence shows an option to ‘plan the scope and sequence of lessons from the syllabus to systematically build student understanding of skills, concepts and content knowledge’ (CESE 2020a:11).

The scope and sequence is a sample, as ‘international evidence that increased local decision making in relation to the curriculum is associated with higher levels of student performance’ (NESA 2020:52).

NESA also acknowledge the importance of a quality scope and sequence to support teaching and learning. They indicate that essential elements to be included in a school’s documented curriculum are ‘a scope and sequence and associated learning programs for each course, including teaching activities mapped against NESA syllabus outcomes and content, and including registration and evaluation’ (NSW Department of Education 2006:7).

This sample scope and sequence aligns with this advice.

## References

**Links to third-party material and websites**

Please note that the provided (reading/viewing material/list/links/texts) are a suggestion only and implies no endorsement, by the New South Wales Department of Education, of any author, publisher, or book title. School principals and teachers are best placed to assess the suitability of resources that would complement the curriculum and reflect the needs and interests of their students.

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AITSL (Australian Institute for Teaching and School Leadership (2017) ‘[Feedback Factsheet](https://www.aitsl.edu.au/teach/improve-practice/feedback#:~:text=FEEDBACK-,Factsheet,-A%20quick%20guide)’, AITSL, accessed 11 November 2022.

Commonwealth of Australia (2015) [‘National STEM School Education Strategy’](https://www.dese.gov.au/education-ministers-meeting/resources/national-stem-school-education-strategy), Education Council, Australian Department of Education, Skills and Employment, accessed 14 November 2022.

NESA (NSW Education Standards Authority) (2020) [*Nurturing Wonder and Igniting Passion, designs for a new school curriculum: NSW Curriculum Review* [PDF 1.12MB]](https://nswcurriculumreform.nesa.nsw.edu.au/pdfs/phase-3/final-report/NSW_Curriculum_Review_Final_Report.pdf), NESA, accessed 11 November 2022.

NESA (NSW Education Standards Authority) (2021a) ‘[Registration Process for the NSW Government Schooling System Manual](https://educationstandards.nsw.edu.au/wps/portal/nesa/regulation/government-schooling/registration-process-government-schooling)’, NESA, accessed 11 November 2022.

NESA (NSW Education Standards Authority) (2021b) ‘[Advice on scope and sequences](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/understanding-the-curriculum/programming/advice-on-scope-and-sequences)’, Programming, NESA website, accessed 11 November 2022.

NESA (NSW Education Standards Authority) (2022) ‘[Proficient Teacher: Standard descriptors](https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/meeting-requirements/the-standards/proficient-teacher)’, The Standards, NESA website, accessed 14 November 2022.

PwC (PricewaterhouseCoopers) Australia (2022) ‘[A smart move](https://www.pwc.com.au/publications/a-smart-move.html)’, PwC Australia, accessed 14 November 2022.

State of New South Wales (Department of Education) (2022) ‘[High Potential and Gifted Education Policy](https://education.nsw.gov.au/policy-library/policies/pd-2004-0051)’, Policy Library, NSW Department of Education, accessed 14 November 2022.

State of New South Wales (Department of Education) (2021) ‘[Rural and Remote Education Strategy (2021-2024)](https://education.nsw.gov.au/about-us/strategies-and-reports/rural-and-remote-education-strategy-2021-24)’, Strategies, reports and plans, NSW Department of Education, accessed 14 November 2022.

State of New South Wales (Department of Education) and CESE (Centre for Education Statistics and Evaluation) (2020a) ‘[What works best: 2020 update](https://education.nsw.gov.au/about-us/educational-data/cese/publications/research-reports/what-works-best-2020-update)’, CESE, NSW Department of Education, accessed 11 November 2022.

State of New South Wales (Department of Education) and CESE (Centre for Education Statistics and Evaluation) (2020b) ‘[What works best in practice](https://education.nsw.gov.au/about-us/educational-data/cese/publications/practical-guides-for-educators-/what-works-best-in-practice)’, CESE, NSW Department of Education, accessed 11 November 2022.

State of New South Wales Department of Premier and Cabinet (2022) ‘[The NSW Industry Development Framework](https://www.investment.nsw.gov.au/living-working-and-business/nsw-industry-development-framework/)’, Living, working and business, Investment NSW website, accessed 14 November 2022.

Tassel L (2019) [‘Why strive for Industry 4.0’](https://www.weforum.org/agenda/2019/01/why-companies-should-strive-for-industry-4-0/), *World Economic Forum agenda articles*, accessed 14 November 2022.