



Flight

A / T / M

Cover Art provided by Canberra College student Aidan Giddings

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The ACT Senior Secondary System

The ACT senior secondary system recognises a range of university, vocational or life skills pathways.

The system is based on the premise that teachers are experts in their area: they know their students and community and are thus best placed to develop curriculum and assess students according to their needs and interests. Students have ownership of their learning and are respected as young adults who have a voice.

A defining feature of the system is school-based curriculum and continuous assessment. School-based curriculum provides flexibility for teachers to address students' needs and interests. College teachers have an opportunity to develop courses for implementation across ACT schools. Based on the courses that have been accredited by the BSSS, college teachers are responsible for developing programs of learning. A program of learning is developed by individual colleges to implement the courses and units they are delivering.

Teachers must deliver all content descriptions; however, they do have flexibility to emphasise some content descriptions over others. It is at the discretion of the teacher to select the texts or materials to demonstrate the content descriptions. Teachers can choose to deliver course units in any order and teach additional (not listed) content provided it meets the specific unit goals.

School-based continuous assessment means that students are continually assessed throughout years 11 and 12, with both years contributing equally to senior secondary certification. Teachers and students are positioned to have ownership of senior secondary assessment. The system allows teachers to learn from each other and to refine their judgement and develop expertise.

Senior secondary teachers have the flexibility to assess students in a variety of ways. For example: multimedia presentation, inquiry-based project, test, essay, performance and/or practical demonstration may all have their place. College teachers are responsible for developing assessment instruments with task specific rubrics and providing feedback to students.

The integrity of the ACT Senior Secondary Certificate is upheld by a robust, collaborative and rigorous structured consensus-based peer reviewed moderation process. System moderation involves all Year 11 and 12 teachers from public, non-government and international colleges delivering the ACT Senior Secondary Certificate.

Only students who desire a pathway to university are required to sit a general aptitude test, referred to as the ACT Scaling Test (AST), which moderates student course scores across subjects and colleges. Students are required to use critical and creative thinking skills across a range of disciplines to solve problems. They are also required to interpret a stimulus and write an extended response.

Senior secondary curriculum makes provision for student-centred teaching approaches, integrated and project-based learning inquiry, formative assessment and teacher autonomy. ACT Senior Secondary Curriculum makes provision for diverse learners and students with mild to moderate intellectual disabilities, so that all students can achieve an ACT Senior Secondary Certificate.

The ACT Board of Senior Secondary Studies (BSSS) leads senior secondary education. It is responsible for quality assurance in senior secondary curriculum, assessment and certification. The Board consists of representatives from colleges, universities, industry, parent organisations and unions. The Office of the Board of Senior Secondary Studies (OBSSS) consists of professional and administrative staff who support the Board in achieving its objectives and functions.

ACT Senior Secondary Certificate

Courses of study for the ACT Senior Secondary Certificate:

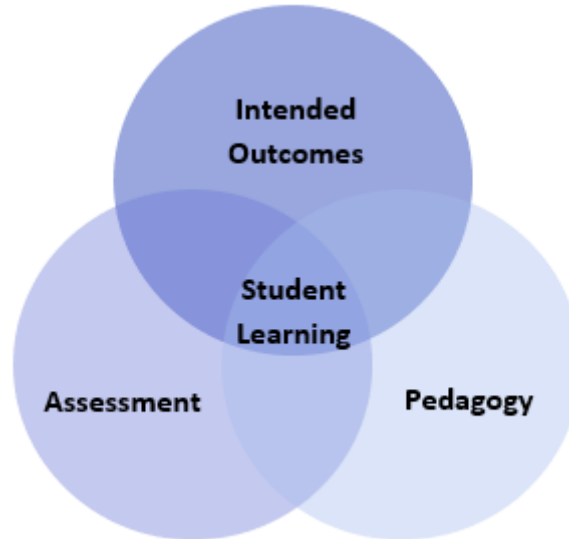
- provide a variety of pathways, to meet different learning needs and encourage students to complete their secondary education
- enable students to develop the essential capabilities for twenty-first century learners
- empower students as active participants in their own learning
- engage students in contemporary issues relevant to their lives
- foster students' intellectual, social and ethical development
- nurture students' wellbeing, and physical and spiritual development
- enable effective and respectful participation in a diverse society.

Each course of study:

- comprises an integrated and interconnected set of knowledge, skills, behaviours and dispositions that students develop and use in their learning across the curriculum
- is based on a model of learning that integrates intended student outcomes, pedagogy and assessment
- outlines teaching strategies which are grounded in learning principles and encompass quality teaching
- promotes intellectual quality, establish a rich learning environment and generate relevant connections between learning and life experiences
- provides formal assessment and certification of students' achievements.

Underpinning beliefs

- All students are able to learn.
- Learning is a partnership between students and teachers.
- Teachers are responsible for advancing student learning.



Learning Principles

1. Learning builds on existing knowledge, understandings and skills.
(Prior knowledge)
2. When learning is organised around major concepts, principles and significant real world issues, within and across disciplines, it helps students make connections and build knowledge structures.
(Deep knowledge and connectedness)
3. Learning is facilitated when students actively monitor their own learning and consciously develop ways of organising and applying knowledge within and across contexts.
(Metacognition)
4. Learners' sense of self and motivation to learn affects learning.
(Self-concept)
5. Learning needs to take place in a context of high expectations.
(High expectations)
6. Learners learn in different ways and at different rates.
(Individual differences)
7. Different cultural environments, including the use of language, shape learners' understandings and the way they learn.
(Socio-cultural effects)
8. Learning is a social and collaborative function as well as an individual one.
(Collaborative learning)
9. Learning is strengthened when learning outcomes and criteria for judging learning are made explicit and when students receive frequent feedback on their progress.
(Explicit expectations and feedback)

General Capabilities

All courses of study for the ACT Senior Secondary Certificate should enable students to develop essential capabilities for twenty-first century learners. These 'capabilities' comprise an integrated and interconnected set of knowledge, skills, behaviours and dispositions that students develop and use in their learning across the curriculum.

The capabilities include:

- literacy
- numeracy
- information and communication technology (ICT)
- critical and creative thinking
- personal and social
- ethical behaviour
- intercultural understanding

Courses of study for the ACT Senior Secondary Certificate should be both relevant to the lives of students and incorporate the contemporary issues they face. Hence, courses address the following three priorities. These priorities are:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia's engagement with Asia
- Sustainability

Elaboration of these General Capabilities and priorities is available on the ACARA website at www.australiancurriculum.edu.au.

Literacy

Literacy is important in students' development of *Science Inquiry Skills* and their understanding of content presented through the *Science Understanding* and *Science as a Human Endeavour* strands. Students gather, interpret, synthesise and critically analyse information presented in a wide range of genres, modes and representations (including text, flow diagrams, symbols, graphs and tables). They evaluate information sources and compare and contrast ideas, information and opinions presented within and between texts. They communicate processes and ideas logically and fluently and structure evidence-based arguments, selecting genres and employing appropriate structures and features to communicate for specific purposes and audiences.

Numeracy

Numeracy is key to students' ability to apply a wide range of *Science Inquiry Skills*, including making and recording observations; ordering, representing and analysing data; and interpreting trends and relationships. Students studying Flight call on a wide range of mathematical concepts, formulae and operations. They employ numeracy skills to interpret complex spatial and graphic representations. They engage in analysis of data, including issues relating to reliability and probability, and they interpret and manipulate mathematical relationships to calculate and predict values. Within the Science Inquiry Skills strand, students are required to gather, represent and analyse numerical data to identify the evidence that forms the basis of their scientific arguments, claims or conclusions. In gathering and recording numerical data, students are required to make measurements with an appropriate degree of accuracy and to represent measurements using appropriate units.

Information and Communication Technology (ICT) Capability

ICT capability is a key part of *Science Inquiry Skills*. Students use a range of strategies to locate, access and evaluate information from multiple digital sources; to collect, analyse and represent data; to model and interpret concepts and relationships; and to communicate and share science ideas, processes and information. Through exploration of *Science as Human Endeavour concepts*, students assess the impact of ICT on the development of aviation and the application of science in society, particularly with regard to collating, storing, managing and analysing large data sets.

Critical and Creative Thinking

Critical and creative thinking is particularly important in the science inquiry process. Science inquiry requires the ability to construct, review and revise questions and hypotheses about increasingly complex and abstract scenarios and to design related investigation methods. Students interpret and evaluate data; interrogate, select and cross-reference evidence; and analyse processes, interpretations, conclusions and claims for validity and reliability, including reflecting on their own processes and conclusions. Science is a creative endeavour and students devise innovative solutions to problems, predict possibilities, envisage consequences and speculate on possible outcomes as they develop *Science Understanding* and *Science Inquiry Skills*. They also appreciate the role of critical and creative individuals and the central importance of critique and review in the development and innovative application of science in developments in flight.

Personal and Social Capability

Personal and social capability is integral to a wide range of activities in Aviation, as students develop and practise skills of communication, teamwork, decision-making, initiative taking and self-discipline with increasing confidence and sophistication. In particular, students develop skills in both independent and collaborative investigation; they employ self-management skills to plan effectively, follow procedures efficiently and work safely; and they use collaboration skills to conduct investigations, share research and discuss ideas. In considering aspects of *Science as a Human Endeavour*, students also recognise the role of their own beliefs and attitudes in their response to aviation issues and applications, consider the perspectives of others, and gauge how science can affect people's lives.

Ethical Understanding

Ethical understanding is a vital part of science inquiry. Students evaluate the ethics of experimental science, codes of practice, and the use of scientific information and science applications. They explore what integrity means in science, and they understand, critically analyse and apply ethical guidelines in their investigations. They consider the implications of their investigations on others, the environment and living organisms. They use scientific information to evaluate the claims and actions of others and to inform ethical decisions about a range of social, environmental and personal issues and applications of science.

Intercultural Understanding

Intercultural understanding is fundamental to understanding aspects of *Science as a Human Endeavour*, as students appreciate the contributions of diverse cultures to developing science understanding and the challenges of working in culturally diverse collaborations. They develop awareness that raising some debates within culturally diverse groups requires cultural sensitivity, and they demonstrate open-mindedness to the positions of others. Students also develop an understanding that cultural factors affect the ways in which science influences and is influenced by society.

Cross-Curriculum Priorities

While the significance of the cross-curriculum priorities for Flight varies, there are opportunities for teachers to select contexts that incorporate the key concepts from each priority.

Aboriginal and Torres Strait Islander Histories and Cultures

Through an investigation of contexts that draw on *Aboriginal and Torres Strait Islander histories and cultures*, students can appreciate Aboriginal and Torres Strait Islander Peoples' understanding of physical phenomena, including of the motion of objects, and of astronomical phenomena.

Asia and Australia's Engagement with Asia

Contexts that draw on Asian scientific research and development and collaborative endeavours in the Asia Pacific region provide an opportunity for students to investigate *Asia and Australia's engagement with Asia*. Students could examine the important role played by people of the Asia region in such areas as medicine, communication technologies, transportation and energy security. They could consider collaborative projects between Australian and Asian scientists and the contribution these make to scientific knowledge.

Sustainability

The cross-curriculum priority of *Sustainability* provides authentic contexts for exploring, investigating and understanding the function and interactions of physical, chemical and biological systems. By investigating the relationships between systems and how systems respond to change, students develop an appreciation for the ways in which matter and energy interactions shape the Earth and its inhabitants. In exploring applications of flight knowledge, students appreciate that science provides the basis for decision making in many areas of society and that these decisions can impact the Earth system. They understand the importance of using science knowledge to predict possible effects of human and other activity, and to develop management plans or alternative technologies that minimise these effects and provide for a more sustainable future.

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Rationale

Air transport has significant impact on contemporary life and is a critical global concern, influencing social, economic and security issues. Students will explore scientific concepts, build scientific skills and develop scientific literacy within an aviation context. This contextual approach harnesses interest and motivation to engage whilst satisfying goals of the Science framework.

This course will provide students with the scientific inquiry skills, capacity for creative and critical thought, and scientific literacy that will assist them in pursuing a career in the aviation or other highly technical, science-based industries.

In a technologically based society, scientific literacy for all citizens is of paramount importance. The Program for International Student Assessment (PISA) defines scientific literacy as “the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand the natural world and the changes made to it through human history.” (OECD: the 2003 PISA Assessment Framework). Scientifically literate individuals contribute to the quality of their own lives and to society through informed decision-making.

Scientific processes challenge current understanding and are continually re-evaluated. In the Flight course, students are constantly encouraged to examine and reconsider their understanding of scientific concepts and inquiry methods and therefore of their world more generally.

Students completing this course will apply scientific principles, mathematical and technological skill to real world applications, particularly in an aviation context. Further, the emphasis on technological, scientific and data literacy will support students who seek further education particularly in science, engineering and aviation.

The Flight course offers opportunities for future pathways in further study at tertiary or vocational level and employment within a broad range of occupations in the civil or military field of aviation.

Goals

Flight aims to develop the students’ ability to:

- demonstrate depth and breadth of scientific knowledge within the aviation context
- apply knowledge and understanding to solve problems in familiar and unfamiliar flight contexts
- critically research, analyse, evaluate and synthesise information on flight from a variety of sources, including their own work and the work of their peers
- develop hypotheses and design, carry out and as necessary modify experiments relating to flight
- follow instructions and make accurate and precise observations while conducting practical investigations, while safely using appropriate equipment and techniques including simulations
- communicate information within the aviation context to diverse audiences in an appropriate manner using a variety of media and technologies
- appreciate the role and implications of science within the context of aviation in the wider community – environmental, social, political and economic
- work independently and collaboratively.

Student Group

Many students who enrol in the Flight Course are fascinated with the discipline, although only a small proportion of these students will gain the appropriate aircrew licence to operate aircraft. The course provides a rigorous background in quantitative and qualitative scientific methods as students explore the fundamental principles of flight. The course provides a unique context for inquiry and problem solving that supports students' learning in other subject areas such as Physics, Mathematics and Geography and is designed to align with the Science Strand Descriptions.

Mathematical skills expected of students studying Flight

The Flight course requires students to use the mathematical skills they have developed through the F-10 Australian Curriculum: Mathematics, in addition to the numeracy skills they have developed through the Science Inquiry Skills strand of the Australian Curriculum: Science.

Within the Science Inquiry Skills strand, students are required to gather, represent and analyse numerical data to identify the evidence that forms the basis of their scientific arguments, claims or conclusions. In gathering and recording numerical data, students are required to make measurements with an appropriate degree of accuracy and to represent measurements using appropriate units.

It is assumed that students will be able to competently:

- perform calculations involving addition, subtraction, multiplication and division of quantities
- perform approximate evaluations of numerical expressions
- express fractions as percentages, and percentages as fractions
- calculate percentages
- recognise and use ratios
- change the subject of a simple equation
- substitute physical quantities into an equation using consistent units so as to calculate one quantity and check the dimensional consistency of such calculations
- solve simple algebraic equations
- comprehend and use the symbols/notations $<$, $>$, \approx , \leq , \geq , Σ
- translate information between graphical, numerical and algebraic forms
- calculate areas of right-angled and isosceles triangles, circumference and area of circles, areas and volumes of rectangular blocks, cylinders and spheres
- use Pythagoras' theorem, similarity of triangles and the angle sum of a triangle.

Unit Titles

- Aviation Science
- Meteorology and Human Factors
- Navigation and Flight Planning
- Commercial Aviation
- Independent Study

Organisation of Content

Aviation Science

In *Aviation Science*, students will study the principles underpinning flight, focussing on the history of manned aircraft; the physics of flight, lift and control; and the structure of powered and non-powered aircraft.

Meteorology and Human Factors

In *Meteorology and Human Factors*, students will study meteorology and its application to aviation and the limitations of aircraft operation and design based on human physiological limitations.

Navigation and Flight Planning

In *Navigation and Flight Planning*, students will study the principles and practices of aircraft navigation, including the relationship between longitude and time, map reading skills, route planning, and the use of radio navigation aids.

Commercial Aviation

In *Commercial Aviation*, students will study specific aspects of the aviation industry and aircraft operation, including the operation of rotary wing aircraft.

Independent Study

An Independent Study unit has an important place in senior secondary courses. It is a valuable pedagogical approach that empowers students to make decisions about their own learning. An Independent Study unit can be proposed by an individual student for their own independent study and negotiated with their teacher. The program of learning for an Independent Study unit must meet the unit goals and content descriptions as they appear in the course.

Independent Study units are only available to individual students in Year 12. A student can only study a maximum of one Independent Study unit in each course. Students must have studied at least three standard 1.0 units from this course. An Independent Study unit requires the principal's written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third 1.0 unit in this course of study.

Science Strand Descriptions

The Australian Curriculum: Science has three interrelated strands: *Science Inquiry Skills*, *Science as a Human Endeavour* and *Science Understanding*. These strands are used to organise the Science learning area from Foundation to Year 12. In the senior secondary Science subjects, the three strands build on students' learning in the F-10 Australian Curriculum: Science.

In the practice of Agricultural science, the three strands are closely integrated: the work of scientists reflects the nature and development of science, is built around scientific inquiry, and seeks to respond to and influence society. Students' experiences of school science should mirror this multifaceted view of science. To achieve this, the three strands of the Australian Curriculum: Science should be taught in an integrated way. The content descriptions for *Science Inquiry Skills*, *Science as a Human Endeavour* and *Science Understanding* have been written so that this integration is possible in each unit.

Science Inquiry Skills

Science inquiry involves identifying and posing questions; planning, conducting and reflecting on investigations; processing, analysing and interpreting data; and communicating findings. This strand is concerned with evaluating claims, investigating ideas, solving problems, reasoning, drawing valid conclusions, and developing evidence-based arguments within agriculture.

Science investigations are activities in which ideas, predictions or hypotheses are tested and conclusions are drawn in response to a question or problem. Investigations can involve a range of activities, including experimental testing, field work, locating and using information sources, conducting surveys, and using modelling and simulations. The investigation design will depend on the context and subject of the investigation.

In science investigations, the collection and analysis of data to provide evidence plays a major role. This can involve collecting or extracting information and reorganising data in the form of tables, graphs, flow charts, diagrams, prose, keys, spreadsheets and databases. The analysis of data to identify and select evidence, and the communication of findings, involve the selection, construction and use of specific representations, including mathematical relationships, symbols and diagrams.

Through the senior secondary Science subjects, students will continue to develop generic science inquiry skills, building on the skills acquired in the F-10 Australian Curriculum: Science. These generic skills are described below and will be explicitly taught and assessed in each unit. In addition, each unit provides more specific skills to be taught within the generic science inquiry skills; these specific skills align with the *Science Understanding* and *Science as a Human Endeavour* content of the unit.

The generic science inquiry skills are:

- identifying, researching and constructing questions for investigation; proposing hypotheses; and predicting possible outcomes
- designing investigations, including the procedure/s to be followed, the materials required and the type and amount of primary and/or secondary data to be collected; conducting risk assessments; and considering ethical research
- conducting investigations, including using equipment and techniques safely, competently and methodically for the collection of valid and reliable data
- representing data in meaningful and useful ways; organising and analysing data to identify trends, patterns and relationships; recognising error, uncertainty and limitations in data; and selecting, synthesising and using evidence to construct and justify conclusions

- interpreting scientific and media texts and evaluating processes, claims and conclusions by considering the quality of available evidence; and using reasoning to construct scientific arguments
- selecting, constructing and using appropriate representations to communicate understanding, solve problems and make predictions
- communicating to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes.

Science as a Human Endeavour

Through science, we seek to improve our understanding and explanations of the natural world. The *Science as a Human Endeavour* strand highlights the development of science as a unique way of knowing and doing, and explores the use and influence of science in society.

As science involves the construction of explanations based on evidence, the development of science concepts, models and theories is dynamic and involves critique and uncertainty. Science concepts, models and theories are reviewed as their predictions and explanations are continually re-assessed through new evidence, often through the application of new technologies. This review process involves a diverse range of scientists working within an increasingly global community of practice and can involve the use of international conventions and activities such as peer review.

The use and influence of science are shaped by interactions between science and a wide range of social, economic, ethical and cultural factors. The application of science may provide great benefits to individuals, the community and the environment, but may also pose risks and have unintended consequences. As a result, decision making about socio-scientific issues often involves consideration of multiple lines of evidence and a range of stakeholder needs and values. As an ever-evolving body of knowledge, science frequently informs public debate, but is not always able to provide definitive answers.

Science Understanding

Science understanding is evident when a person selects and integrates appropriate science concepts, models and theories to explain and predict phenomena, and applies those concepts, models and theories to new situations. Models in science can include diagrams, physical replicas, mathematical representations, word-based analogies (including laws and principles) and computer simulations. Development of models involves selection of the aspects of the system/s to be included in the model, and thus models have inherent approximations, assumptions and limitations.

The *Science Understanding* content in each unit develops students' understanding of the key concepts, models and theories that underpin the subject, and of the strengths and limitations of different models and theories for explaining and predicting complex phenomena.

Science Understanding can be developed through the selection of contexts that have relevance to and are engaging for students.

Teaching and Learning Strategies

- practical (e.g. paper, model and RC planes, wind tunnels, balloon rockets, water rockets, avian anatomy dissections), sources of error in magnetic compasses, astronomical observations
- laboratory experiments (using levers, spring balances, pendula, thermometers, barometers, data loggers – particularly PV sensors, force sensors, ultrasonic sensors)
- computer simulation – e.g. aerofoil simulation, fluid dynamics simulations, flight simulators
- interactive ICT – e.g. using accelerometers in iPhones, Nintendo Wii, Microsoft Kinect etc. to access real-time, dynamic 3D data
- excursions (e.g. flight training schools, ADFA, DSTO, ADF, commercial airlines, glider training schools, air shows, Woomera Space Camp, amateur model rocket club events)
- inquiry-based learning (e.g. effect of aircraft and component design on flight time, glide angle, stall angle, stability, control, etc.)
- open-ended investigations (e.g. design/build a simple aircraft with characteristics which satisfy a design brief, investigate effect of parachute parameters on drag)
- analysis and deconstruction of technical texts –e.g. linking CASA flight rules, operational requirements and air law with their basis in scientific theory and risk reduction
- analysis of authentic Air Services Australia General Flying Proficiency Test (GFPT) and Private Pilot Licence (PPL) exam questions to understand the requirements of pilots and the relationship between scientific theory and operational requirements
- collaborative learning (group investigations, use of appropriate technology such as blogs, cLc, wikis)
- visiting scientists, pilots, aerodynamicists and aeronautical engineers
- modelling (mathematical, CAD, physical models, wind tunnel tests, graphical analysis of flight data)
- use of information and communication technologies (ICT), including data loggers, online resources and appropriate software packages (CAD, simulations, MatLab etc.)
- peer tutoring/student presentations/student as teacher
- scientific communication – scientific posters, journal articles, 'popular science' articles
- integration of teacher-student and student-teacher feedback
- teacher instruction – lectures, discussions, skills instruction
- teacher demonstrations
- student reflection on their learning (e.g. use of learning journals etc)

Assessment

The identification of criteria within the achievement standards and assessment task types and weightings provides a common and agreed basis for the collection of evidence of student achievement.

Assessment Criteria (the dimensions of quality that teachers look for in evaluating student work) provide a common and agreed basis for judgement of performance against unit and course goals, within and across colleges. Over a course, teachers must use all these criteria to assess students' performance but are not required to use all criteria on each task. Assessment criteria are to be used holistically on a given task and in determining the unit grade.

Assessment Tasks elicit responses that demonstrate the degree to which students have achieved the goals of a unit based on the assessment criteria. The Common Curriculum Elements (CCE) is a guide to developing assessment tasks that promote a range of thinking skills (see Appendix C). It is highly desirable that assessment tasks engage students in demonstrating higher order thinking.

Rubrics are constructed for individual tasks, informing the assessment criteria relevant for a particular task and can be used to assess a continuum that indicates levels of student performance against each criterion.

Assessment Criteria

Students will be assessed on the degree to which they demonstrate:

- concepts, models and application
- contexts
- inquiry skills.

Assessment Task Types

Suggested tasks

Individual tasks may incorporate one or more of the following:

- models
- commentary
- debate
- portfolio/journal
- field work
- investigation
- document/source analysis
- practical report
- role play
- research report
- test/quiz
- seminar/workshop/lecture
- poster
- response to stimulus
- essay
- multimedia presentation
- creative response
- interview
- discussion forum
- rationale/validation
- practical skills

It is recommended that a student conceived investigation be undertaken at least once during a minor and twice during a major. This investigation may either be theoretical or practical, or a combination of both.

Weightings in A/T/M 1.0 and 0.5 Units:

No task to be weighted more than 45% for a standard 1.0 unit.

Additional Assessment Information

- For a standard unit (1.0), students must complete a minimum of three assessment tasks and a maximum of five.
- For a half standard unit (0.5), students must complete a minimum of two and a maximum of three assessment tasks.
- Students must experience a variety of task types and different modes of communication to demonstrate the Achievement Standards in both theoretical and practical tasks.
- All Achievement Standards must be demonstrated in standard (1.0) or half-standard (0.5) units.
- Task types need to be selected to address all Achievement Standards within the Concepts, Models & Applications, Contexts and Inquiry Skills strands across a standard (1.0) or half-standard (0.5) unit.
- For tasks completed in unsupervised conditions, schools need to have mechanisms to uphold academic integrity, for example: student declaration, plagiarism software, oral defence, interview, or other validation tasks.

Achievement Standards

Years 11 and 12 achievement standards are written for A/T courses. A single achievement standard is written for M courses.

A Year 12 student in any unit is assessed using the Year 12 achievement standards. A Year 11 student in any unit is assessed using the Year 11 achievement standards. Year 12 achievement standards reflect higher expectations of student achievement compared to the Year 11 achievement standards. Years 11 and 12 achievement standards are differentiated by cognitive demand, the number of dimensions and the depth of inquiry.

An achievement standard cannot be used as a rubric for an individual assessment task. Assessment is the responsibility of the college. Student tasks may be assessed using rubrics or marking schemes devised by the college. A teacher may use the achievement standards to inform development of rubrics. The verbs used in achievement standards may be reflected in the rubric. In the context of combined Years 11 and 12 classes, it is best practice to have a distinct rubric for Years 11 and 12. These rubrics should be available for students prior to completion of an assessment task so that success criteria are clear.

Achievement Standards for Science A Course – Year 11

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
Concepts, Models &	<ul style="list-style-type: none"> analyses the fundamental properties and functions of system components, processes and interactions, and how they are affected by factors across a range of temporal and spatial scales analyses the nature, functions, limitations and applications of theories and models using evidence, in unfamiliar contexts assesses processes and claims, provides a critique based on evidence, and discusses alternatives 	<ul style="list-style-type: none"> explains the fundamental properties and functions of system components, processes and interactions, and how they are affected by factors across a range of temporal and spatial scales explains the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts explains processes and claims, provides a critique with reference to evidence, and identifies alternatives 	<ul style="list-style-type: none"> describes the fundamental properties and functions of system components, processes and interactions, and how they are affected by factors across a range of temporal and spatial scales describes the nature, functions, limitations and applications of theories and models with supporting evidence describes processes and claims, and identifies alternatives with some reference to evidence 	<ul style="list-style-type: none"> identifies the fundamental properties and functions with some identification of system components and factors that affect processes across a range of temporal and spatial scales identifies the nature, functions, applications, and some possible limitations of theories and models, with some evidence identifies processes and claims, and identifies the need for improvements with some reference to evidence 	<ul style="list-style-type: none"> identifies the fundamental properties and functions with little or no identification of system components, processes, interactions and contextual scales identifies the nature, function of theories and models, with an assertion of a few possible limitations identifies processes and the need for some improvements, with little or no reference to evidence
Contexts	<ul style="list-style-type: none"> analyses how the practice and applications of science meet needs, make decisions; and is influenced by social, economic, technological, and ethical factors 	<ul style="list-style-type: none"> explains how the practice and applications of science meet needs, make decisions, and is influenced by social, economic, technological, and ethical factors 	<ul style="list-style-type: none"> describes how the applications of science meet needs, make decisions, and is influenced by social, economic, technological, and ethical factors 	<ul style="list-style-type: none"> identifies ways in the applications of science meet needs, and is influenced by some factors 	<ul style="list-style-type: none"> identifies ways in which the application of science has been used in society to meet needs
Inquiry Skills	<ul style="list-style-type: none"> designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that efficiently collect valid and reliable data in response to a complex question analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and analyses errors reflects with insight on their own thinking and learning and evaluates planning, time management and use of appropriate strategies to work independently and collaboratively communicates concisely, effectively and accurately, demonstrating scientific literacy in a range of modes, styles, representations, and genres for specific audiences and purposes, with appropriate evidence and accurate referencing 	<ul style="list-style-type: none"> designs, conducts and improves safe, ethical inquiries individually and collaboratively, that collect valid data in response to a complex question explains causal and correlational relationships, anomalies, reliability and validity of data and representations, and explains errors reflects on their own thinking and analyses planning, time management, use of appropriate strategies to work independently and collaboratively communicates clearly and accurately, demonstrating scientific literacy in a range of modes, styles, representations and genres for specific audiences and purposes, with appropriate evidence and accurate referencing 	<ul style="list-style-type: none"> plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a question describes relationships in data sets, reliability and validity of data and representations, and describes common errors reflects on their own thinking and explains planning, time management, use of appropriate strategies to work independently and collaboratively communicates accurately demonstrating scientific literacy, in a range of modes, styles, representations, and genres for specific purposes, with appropriate evidence and mostly consistent referencing 	<ul style="list-style-type: none"> follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a question with varying success identifies trends and anomalies in data and representations, with general comments about errors reflects on their own thinking with some reference to planning, time management, use of appropriate strategies to work independently and collaboratively communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing 	<ul style="list-style-type: none"> follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question identifies trends in data and representations, with little or no reference to anomalies and errors reflects on their own thinking with little or no reference to planning, time management, use of appropriate strategies to work independently and collaboratively communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing

Achievement Standards for Science T Course – Year 11

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
Concepts, Models & Applications	<ul style="list-style-type: none"> critically analyses the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales evaluates the nature, functions, limitations and applications of theories and models using evidence, in unfamiliar contexts analyses evidence with reference to models and/or theories, and develops evidence-based conclusions and evaluates limitations 	<ul style="list-style-type: none"> analyses the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales analyses the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts assesses evidence with reference to models and/or theories, and develops evidence-based conclusions and discusses limitations 	<ul style="list-style-type: none"> explains the fundamental properties and functions of system components, processes and interactions and the effects of factors across a range of scales explains the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts explains evidence with reference to models and/or theories, and develops evidence-based conclusions and identifies limitations 	<ul style="list-style-type: none"> describes the fundamental properties and functions, and with some description of system components, processes and interactions, and the effects of factors across a range of scales describes the nature, functions, limitations and applications of theories and models with supporting evidence describes evidence, and develops conclusions with some reference to models and/or theories 	<ul style="list-style-type: none"> identifies the fundamental properties and functions of system and identifies components, processes and interactions, and the effects of factors across a range of scales identifies the nature, functions, applications, and some possible limitations of theories and models, with some evidence identifies evidence, and asserts conclusions with little or no reference to models and/or theories
Contexts	<ul style="list-style-type: none"> critically analyses epistemology, role of peer review, collaboration and technology in developing knowledge critically analyses the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> analyses epistemology, role of peer review and technology in developing knowledge analyses the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> explain epistemology, role of peer review and technology in developing knowledge explains the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> describes the role of peer review in developing knowledge describes the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> identifies that scientific knowledge has changed over time identifies the influence of social, economic, ethical and cultural factors on Science
Inquiry Skills	<ul style="list-style-type: none"> designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that collect valid, reliable data in response to a complex question analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and analyses errors analyses processes and claims, and provides a critique based on evidence, and critically analyses alternatives reflects with insight on own thinking and that of others, and evaluates planning, time management, and use of appropriate work strategies to work independently and collaboratively communicates concisely, effectively and accurately, demonstrating scientific literacy in a range of modes, styles, representations, and genres for specific audiences and purposes, with appropriate evidence and accurate referencing 	<ul style="list-style-type: none"> designs, conducts and improves safe, ethical inquiries individually and collaboratively, that collect valid, reliable data in response to a question analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and discusses errors assesses processes and claims, and provides a critique with reference to evidence, and analyses alternatives reflects on their own thinking and analyses planning, time management, use of appropriate work strategies to work independently and collaboratively communicates clearly and accurately, demonstrating scientific literacy in a range of modes, styles, representations and genres for specific audiences and purposes, with appropriate evidence and accurate referencing 	<ul style="list-style-type: none"> plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a familiar question explains causal and correlational relationships, anomalies, reliability and validity of data and representations, and cites common errors explains processes and claims, and identifies alternatives with reference to reliable evidence reflects on their own thinking and explains planning, time management, use of appropriate work strategies to work independently and collaboratively communicates accurately demonstrating scientific literacy, in a range of modes, styles, representations, and genres for specific purposes, with appropriate evidence and mostly consistent referencing 	<ul style="list-style-type: none"> follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a simple question with varying success describes trends, relationships and anomalies in data, identifies anomalies, and some possible sources of error describes processes and claims, and identifies the need for improvements with some reference to evidence reflects on their own thinking, with reference to planning and the use of appropriate work strategies to work independently and collaboratively communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing 	<ul style="list-style-type: none"> follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question identifies trends and relationships in data, with little or no reference to sources of error identifies processes and the need for some improvements, with little or no reference to evidence reflects on their own thinking with little or no reference to planning, time management, and use of work strategies to work independently and collaboratively communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing

Achievement Standards for Science A Course – Year 12

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
Concepts, Models & Applications	<ul style="list-style-type: none"> analyses the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales analyse the nature, functions, limitations and applications of theories and models using evidence, in unfamiliar contexts assesses evidence with reference to models and/or theories, and develops evidence-based conclusions and evaluates limitations 	<ul style="list-style-type: none"> explains the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales explains the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts explains evidence with reference to models and/or theories, and develops evidence-based conclusions and discusses limitations 	<ul style="list-style-type: none"> describes the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales describes the nature, functions, limitations and applications of theories and models using evidence, in familiar contexts describes evidence with reference to models and/or theories, and develops evidence-based conclusions and identifies limitations 	<ul style="list-style-type: none"> describes the fundamental properties and functions of system components, processes and interactions, and the effects of one or more factors describes the nature, functions, limitations and applications of theories and models with supporting evidence describes evidence, and develops conclusions with some reference to models and/or theories 	<ul style="list-style-type: none"> identifies the fundamental properties and functions of system components, processes and interactions, and the effects of factors identifies the nature, functions, applications, and some limitations of theories and models with some evidence identifies evidence, and asserts conclusions with little or no reference to models and/or theories
Contexts	<ul style="list-style-type: none"> analyses epistemology, role of peer review, collaboration and technology in developing knowledge analyses the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> explains epistemology, role of peer review and technology in developing knowledge explains the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> describes epistemology, role of peer review and technology in developing knowledge describes the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> describes role of peer review and technology in developing knowledge describes the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> identifies that scientific knowledge has changed over time identifies the influence of social, economic, ethical and cultural factors on Science
Inquiry Skills	<ul style="list-style-type: none"> designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that collect valid, reliable data in response to a complex question analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and analyses errors analyses processes and claims, and provides a critique based on evidence, and analyses alternatives reflects with insight on own thinking and that of others and, evaluates planning, time management and use of appropriate independent and collaborative work strategies communicates concisely, effectively and accurately, demonstrating scientific literacy in a range of modes, styles, representations, and genres for specific audiences and purposes, with appropriate evidence and accurate referencing 	<ul style="list-style-type: none"> designs, conducts and improves safe, ethical inquiries individually and collaboratively, that collect valid, reliable data in response to a question analyses causal and correlational relationships, anomalies, reliability and validity of data and representations, and discusses errors explains processes and claims, and provides a critique with reference to evidence, and proposes alternatives reflects on their own thinking and analyses planning, time management, and use of appropriate independent and collaborative work strategies communicates clearly and accurately, demonstrating scientific literacy in a range of modes, styles, representations and genres for specific audiences and purposes, with appropriate evidence and accurate referencing 	<ul style="list-style-type: none"> plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a familiar question describes causal and correlational relationships, anomalies, reliability and validity of data and representations, and cites common errors describes processes and claims, and identifies alternatives with reference to reliable evidence reflects on their own thinking and explains planning, time management, and use of appropriate independent and collaborative work strategies communicates accurately demonstrating scientific literacy, in a range of modes, styles, representations, and genres for specific purposes, with appropriate evidence and mostly consistent referencing 	<ul style="list-style-type: none"> follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a simple question with varying success describes trends, relationships and anomalies in data, identifies anomalies, and some possible sources of error describes processes and claims, and identifies the need for improvements with some reference to evidence reflects on their own thinking, with reference to planning and the use of appropriate independent and collaborative work strategies communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing 	<ul style="list-style-type: none"> follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question identifies trends and relationships in data, with little or no reference to sources of error identifies processes and the need for some improvements, with little or no reference to evidence reflects on their own thinking with little or no reference to planning, time management, and use of appropriate independent and collaborative work strategies communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing

Achievement Standards for Science T Course – Year 12

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
Concepts, Models & Applications	<ul style="list-style-type: none"> critically analyses the properties and functions of system components, processes and interactions, and the interplay and effects of factors across a range of scales evaluates applications, limitations, and predictions of theories and models to explain systems and create solutions, with evidence, in unfamiliar contexts evaluates evidence with reference to critical analysis of models and/or theories, and develops evidence-based conclusions and evaluates limitations 	<ul style="list-style-type: none"> analyses the properties and functions of system components, processes and interactions, and the interplay and effects of factors across a range of scales analyses applications, limitations, and predictions of theories and models to explain systems and create plausible solutions, with evidence in familiar contexts analyses evidence with reference to models and/or theories, and develops evidence-based conclusions and discusses limitations 	<ul style="list-style-type: none"> explains the fundamental properties and functions of system components, processes and interactions, and the effects of factors across a range of scales explains applications, limitations, and predictions of theories and models to explain systems and create plausible solutions in familiar contexts describes evidence with reference to models and/or theories, and develops evidence-based conclusions and identifies limitations 	<ul style="list-style-type: none"> describes the fundamental properties and functions of system components, processes and interactions, and the effects of one or more factors describes the nature, functions, limitations and applications of theories and models to create solutions to problems with supporting evidence describes evidence, and develops conclusions with some reference to models and/or theories 	<ul style="list-style-type: none"> identifies the fundamental properties and functions of system components, processes and interactions, and some affective factors identifies the nature, functions, limitations and applications of theories and models, and suggest solutions to problems with supporting evidence identifies evidence, and asserts conclusions with little or no reference to models and/or theories
Contexts	<ul style="list-style-type: none"> critically analyses epistemology, role of peer review, collaboration, and technology in developing knowledge critically analyses the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> analyses epistemology, role of peer review and technology in developing knowledge analyses the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> explains epistemology, role of peer review and technology in developing knowledge explains the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> describes role of peer review and technology in developing knowledge describes the influence of social, economic, ethical and cultural factors on Science 	<ul style="list-style-type: none"> identifies that scientific knowledge has changed over time identifies the influence of social, economic, ethical and cultural factors on Science
Inquiry Skills	<ul style="list-style-type: none"> designs, conducts and improves safe, ethical and original inquiries individually and collaboratively, that collect valid, reliable data in response to a complex question critically analyses cause and correlation, anomalies, reliability and validity of data and representations, and critically analyses errors evaluates processes and claims, and provides a critique based on evidence, and critically analyses alternatives reflects with insight on own thinking and that of others, evaluates planning, time management, and use of appropriate independent and collaborative work strategies communicates concisely, effectively and accurately, with scientific literacy in a range of modes, representations, and genres for specific audiences and purposes, and accurate referencing 	<ul style="list-style-type: none"> designs, conducts and improves safe, ethical inquiries individually and collaboratively, that collect valid, reliable data in response to a question analyses cause and correlation, anomalies, reliability and validity of data and representations, and analyses errors explains processes and claims, and provides a critique with reference to evidence, and analyses alternatives reflects on their own thinking and analyses planning, time management, and use of appropriate independent and collaborative work strategies communicates clearly and accurately, with scientific literacy in a range of modes, representations and genres for specific audiences and purposes, and accurate referencing 	<ul style="list-style-type: none"> plans and conducts safe, ethical inquiries individually and collaboratively, that collect valid data in response to a familiar question describes causal and correlational relationships, anomalies, reliability and validity of data and representations, and discusses common errors describes processes and claims, and identifies alternatives with reference to reliable evidence reflects on their own thinking and explains planning, time management, and use of appropriate independent and collaborative work strategies communicates accurately demonstrating scientific literacy, in a range of modes, representations, and genres for specific purposes, and mostly consistent referencing 	<ul style="list-style-type: none"> follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data in response to a simple question with varying success describes trends, relationships and anomalies in data, identifies anomalies, and cites sources of error describes processes and claims, and identifies the need for improvements with some reference to evidence reflects on their own thinking, with reference to planning and the use of appropriate independent and collaborative work strategies communicates demonstrating some scientific literacy, in a range of modes, representations, and genres with some evidence and inconsistent referencing 	<ul style="list-style-type: none"> follows a procedure to conduct safe, ethical inquiries individually and collaboratively, to collect data with little or no connection to a question identifies trends and relationships in data with reference to sources of error identifies processes and the need for some improvements, with little or no reference to evidence reflects on their own thinking with little or no reference to planning, time management, and use of appropriate independent and collaborative work strategies communicates demonstrating limited scientific literacy, in a range of modes and representations, with inconsistent and inaccurate referencing

Achievement Standards for Science M Course – Years 11 and 12

	<i>A student who achieves an A grade typically</i>	<i>A student who achieves a B grade typically</i>	<i>A student who achieves a C grade typically</i>	<i>A student who achieves a D grade typically</i>	<i>A student who achieves an E grade typically</i>
Concepts, Models & Applications	<ul style="list-style-type: none"> describes the properties and functions of system components and processes with independence describes system components and processes with some reference to how they are affected by factors with independence 	<ul style="list-style-type: none"> describes the properties and functions of system components, processes and interactions with assistance describes system components, processes and interactions with some reference to how they are affected by factors with assistance 	<ul style="list-style-type: none"> identifies the properties and functions of system components, processes and interactions with independence identifies system components, processes and interactions with independence 	<ul style="list-style-type: none"> identifies the properties and functions of system components, processes and interactions with assistance identifies system components, processes and interactions with assistance 	<ul style="list-style-type: none"> identifies the properties and functions of system components, processes and interactions with direct instruction identifies system components, processes and interactions with direct instruction
Contexts	<ul style="list-style-type: none"> describes the impact of science on an aspect of society with independence 	<ul style="list-style-type: none"> describes the impact of science on an aspect of society with some independence 	<ul style="list-style-type: none"> identifies the impact of science on an aspect of society with independence 	<ul style="list-style-type: none"> identifies the impact of science on an aspect of society with assistance 	<ul style="list-style-type: none"> identifies the impact of science on an aspect of society with direct instruction
Inquiry Skills	<ul style="list-style-type: none"> plans and conducts investigations in response to a question or problem with independence draws evidence-based conclusions from investigations with independence reflects on own thinking and learning in science with independence communicates findings effectively with independence 	<ul style="list-style-type: none"> plans and conducts investigations in response to a question or problem with some independence draws evidence-based conclusions from investigations with some independence reflects on own thinking and learning in science with some independence communicates findings effectively with some independence 	<ul style="list-style-type: none"> plans and conducts investigations in response to a question or problem with assistance draws evidence-based conclusions from investigations with assistance reflects on own thinking and learning in science with assistance communicates findings with assistance 	<ul style="list-style-type: none"> plans and conducts investigations in response to a question or problem with repeated cueing draws evidence-based conclusions from investigations with repeated cueing reflects on own thinking and learning in science with repeated cueing communicates findings with repeated cueing 	<ul style="list-style-type: none"> follows a procedure to conduct investigations to collect data with direct instruction draws evidence-based conclusions from investigations with direct instruction reflects on own thinking and learning in science with direct instruction communicates findings with direct instruction

Aviation Science

Value: 1.0

Aviation Science a

Value 0.5

Aviation Science b

Value 0.5

Unit Description

In this unit students will study the principles underpinning flight, focussing on the history of manned aircraft; the physics of flight, lift and control; and the structure of powered and non-powered aircraft. Students use maths in quantitative and qualitative physics of flight. Students develop science inquiry skills and learn about science as a human endeavour.

Specific Unit Goals

This unit should enable students to:

A course	T course	M course
<ul style="list-style-type: none"> • describe the science behind the principles of flight • design and carry out experiments and simulations • identify and describe aircraft components and instruments • describe and discuss control systems and their operation • describe the need for aircraft weight and balance and their effect on safe flight 	<ul style="list-style-type: none"> • demonstrate depth and breadth of scientific knowledge of the principles of flight • hypothesise, design and modify experiments and simulations • analyse aircraft components, instrumentation and design elements • communicate specialised information about control systems and their effect on flight • demonstrate understanding of aircraft weight and balance and their effect on safe flight 	<ul style="list-style-type: none"> • describe how wing and aircraft design enable flight • participate in experiments and conduct simulations • identify and describe aircraft components and instruments • describe aircraft controls • understand that aircraft must be correctly balanced for safe flight

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A course	T course	M course
Science Inquiry Skills		
<ul style="list-style-type: none"> • conduct research that explores the design, structure and operation of various types of aircraft • conduct simple investigations using equipment and models to safely explore the requirements for flight using scientific method 	<ul style="list-style-type: none"> • identify, research and construct questions that investigate the design and structure and operation of aircraft • design investigations, conduct risk assessments and consider research ethics relating to the design and flight of aircraft using scientific method 	<ul style="list-style-type: none"> • explore the design, structure and operation of various types of aircraft alone or in groups • experiment with equipment and models to safely explore the requirements for flight

A course	T course	M course
<ul style="list-style-type: none"> • represent data in meaningful and useful ways, including using appropriate SI units and symbols • interpret and compare a range of aviation and media texts and identify important information by considering the quality of available evidence • use appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance • communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports 	<ul style="list-style-type: none"> • represent and organise data in meaningful and useful ways, including using appropriate SI units and symbols, to identify trends, patterns and relationships • interpret a range of aviation and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments • select, use and interpret appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance • communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports 	<ul style="list-style-type: none"> • use appropriate language and symbols to describe aircraft operations • communicate to audiences using appropriate language
Science as Human Endeavour		
<ul style="list-style-type: none"> • describe the history and development of aviation and aircraft design • understand and discuss the roles of specialist professions in the development, design, construction and maintenance of aircraft • discuss ethical, legal and environmental issues related to the use of aircraft • recognise that social, economic, cultural and ethical considerations influence the adoption of new technology 	<ul style="list-style-type: none"> • analyse the effects of experimentation on the development of aviation and aircraft design • analyse and explain the roles of researchers from a variety of fields in the development and design of aircraft, engines and technologies. • critique the ethical, legal and environmental issues that influence the development and use of aircraft • Identify social, economic, cultural and ethical considerations that have influenced the adoption of new technology in aviation 	<ul style="list-style-type: none"> • describe some of the ways in which aircraft design has changed over time • identify many of the specialist professions that contribute to the construction and maintenance of aircraft • recognise legal and environmental issues related to the use of aircraft

A course	T course	M course
Science Understanding		
<ul style="list-style-type: none"> • understand and apply measurement, units and uncertainty used in aviation • Investigate and report on a research topic • use graphical techniques to solve vector problems • describe light aircraft structure, major systems and airframe design • describe the effect of the four aerodynamic forces – lift, drag, thrust and weight • describe the effect of torque and balance on aircraft loading and operation • identify flight controls and describe their operation • understand the causes of stalling, spinning & spiral dives and their outcome • describe static and dynamic pressure and their application for flight instruments • investigate wing aerodynamics, including fluid flow, Bernoulli’s theorem, turbulent and laminar airflow and boundary layer effects • describe the major components of piston engines and compare them to jet turbine engines • describe the structure and operation of propellers • understand the effects of moisture, temperature and pressure on engine operation and carburettor icing 	<ul style="list-style-type: none"> • understand and apply measurement, units and uncertainty used in aviation • design and conduct an investigation and report the findings • accurately use graphical and trigonometric methods to solve vector problems • understand and communicate the principles of light aircraft structure • analyse and quantify the four aerodynamic forces – lift, drag, thrust and weight • understand and calculate torque and balance and its effect on aircraft loading and operation • identify flight controls and describe their operation, including first and second order effects of control • understand the causes of stalling, spinning & spiral dives and methods of recovery • discuss the differences between static and dynamic pressure and their application for specific flight instruments • understand and illustrate wing aerodynamics, including fluid flow, Bernoulli’s theorem, turbulent and laminar airflow and boundary layer effects • discuss in detail the major components of piston engines and jet turbine engines and their operation and management • explain the structure and operation of propellers referring to their geometric pitch and blade shape • explain the causes of carburettor icing and the effects of temperature and pressure on engine operation 	<ul style="list-style-type: none"> • use correct aviation units of measurement • use appropriate text to describe an investigation • describe the structure of light aircraft • identify the four aerodynamic forces – lift, drag, thrust and weight • describe the controls used to operate an aircraft • describe spins and spiral dives and their outcome • describe wing shape and the role of the airfoil in producing lift • Identify engine types and their use for low-level and high level flight • identify types of propeller

A course	T course	M course
<ul style="list-style-type: none"> • understand the factors affecting take-off and landing performance 	<ul style="list-style-type: none"> • understand and calculate the factors affecting take-off and landing performance using p-charts 	

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 13-15.

Meteorology and Human Factors

Value: 1.0

Meteorology and Human Factors a

Value 0.5

Meteorology and Human Factors b

Value 0.5

Unit Description

In this unit students will study meteorology and its application to aviation and the limitations of aircraft operation and design based on human physiological limitations. Students use maths in quantitative and qualitative descriptions. Students develop science inquiry skills and learn about science as a human endeavour.

Specific Unit Goals

This unit should enable students to:

A course	T course	M course
<ul style="list-style-type: none"> • demonstrate scientific understanding of meteorology relevant to aviation • apply knowledge and understanding of weather systems to solve basic practical and theoretical problems in meteorology • describe the relationship between specific variables in meteorology, such as changes in weather due to fronts and cloud formation • demonstrate basic understanding of human physiology as it applies to aviation, especially the eyes, ears, vestibular apparatus, lungs and circulation • discuss the effects of drugs and medications on aircrew 	<ul style="list-style-type: none"> • demonstrate depth and breadth of scientific knowledge of the physical processes underlying meteorology • critically research, analyse, evaluate and synthesise meteorological data from a variety of sources • develop hypotheses and design models and simulations to investigate the relationship between physical variables in meteorology • demonstrate depth of understanding of human physiology as it applies to aviation, especially the eyes, ears, vestibular apparatus, lungs and circulation • research and discuss the effects of drugs and medications on aircrew 	<ul style="list-style-type: none"> • discuss ways in which weather conditions affect aviation • demonstrate ability to read and interpret weather reports and synoptic charts to predict weather conditions • explain the meaning of cold and warm fronts and the most likely weather conditions they cause • describe potential problems

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A course	T course	M course
Science Inquiry Skills		
<ul style="list-style-type: none"> • conduct research that explains weather systems and their effects on safe flight • Interpret the various types of aviation weather report and describe when each type is used • represent data in meaningful and useful ways, including using appropriate SI units and symbols • interpret and compare a range of aviation and media texts and identify important information by considering the quality of available evidence • use appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance • use appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance 	<ul style="list-style-type: none"> • identify, research and construct questions that explain weather systems and their effects on safe flight • evaluate the safe use of different types of aviation weather report and equipment for communicating weather conditions across Australia • represent and organise data in meaningful and useful ways, including using appropriate SI units and symbols, to identify trends, patterns and relationships • investigate a range of aviation and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments • select, use and interpret appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance • select, use and interpret appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance 	<ul style="list-style-type: none"> • identify examples of weather systems that adversely affect flight • describe the types of weather report available to the aviation industry and their use • use appropriate SI units and aviation units in their correct context • investigate a range of texts discussing aviation issues
Science as Human Endeavour		
<ul style="list-style-type: none"> • discuss the importance of aviation meteorology for aircraft operations and safety • understand how to obtain meteorological information in Australia and the role of the Bureau of Meteorology in producing aviation weather forecasts 	<ul style="list-style-type: none"> • predict the safety implications of meteorological information obtained through various sources • analyse and describe the work of researchers and meteorologists in the development and application of weather forecasting systems and technologies 	<ul style="list-style-type: none"> • recognise that weather conditions affect flight safety • identify weather maps and online resources that provide meteorological information

A course	T course	M course
<ul style="list-style-type: none"> • discuss ethical, legal and environmental issues related to the safe use of aircraft • identify the structure of the atmosphere • understand the effect of the Earth’s radiation budget on atmospheric temperature • understand the relationship between density, temperature and pressure for an ideal gas • recognise and describe the inverse relationship between humidity and temperature • understand the relation between dewpoint and fog formation • identify major cloud types and their associated weather • describe frontal systems and pressure gradients and major cloud types and their associated weather • access and interpret area forecasts, TAFs, meteorological reports, and synoptic charts • identify Australian weather services for flight planning • understand and describe the anatomy of the circulatory and respiratory systems, the ear and the eye • understand the limits of vision and vision illusions • identify the role of stress, arousal and fatigue in flight safety • recognise the importance of effective decision-making steps 	<ul style="list-style-type: none"> • critique the ethical, legal and environmental issues that influence the safe use of aircraft • identify the structure of the atmosphere and the effect on the temperature gradient • explain the effect of the Earth’s radiation budget and atmospheric temperature on weather • apply the Boyle’s Law to the relationship between density, temperature and pressure for an ideal gas • recognise and describe the inverse relationship between humidity and temperature • define dew point and its relevance to condensation and fog • define specific and latent heat and their roles in atmospheric energy transfer • plot information about frontal systems and synoptic charts to predict wind direction, cloud types and weather -conditions • interpret area forecasts, TAFs, meteorological reports, synoptic charts and aerological diagrams • identify Australian weather services for flight planning • understand and illustrate the anatomy and function of the circulatory and respiratory systems, the ear and the eye • discuss the limits of vision and vision illusions and provide specific examples relevant to aviation • evaluate the role of stress, arousal and fatigue in flight safety • identify factors in effective decision-making and cockpit workload management 	<ul style="list-style-type: none"> • identify legal and environmental issues related to the safe use of aircraft • understand that the atmosphere is multilayered • describe the effect of heating on different surfaces of the earth • demonstrate ability to read temperature and humidity scales • understand methods of heat transfer • understand that frontal systems and cloud types indicate likely weather conditions • understand the key features of the human circulatory, respiratory systems and the ear and eye • discuss some potential causes of stress that might affect work capacity

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 13-15.

Navigation and Flight Planning

Value: 1.0

Navigation and Flight Planning a

Value 0.5

Navigation and Flight Planning b

Value 0.5

Unit Description

In this unit students will study the principles and practices of aircraft navigation, including the relationship between longitude and time, chart reading skills, route planning, and the use of radio navigation aids. Students use maths such in investigations. They develop science inquiry skills and learn about science as a human endeavour.

Specific Unit Goals

This unit should enable students to:

A course	T course	M course
<ul style="list-style-type: none"> • describe the history of mapping, navigation and time-keeping and its application to aviation • identify key features in charts used in aviation • use simple navigation equipment to plan a flight and measure distance, and direction • calculate time in flight and ground speed and use to predict fuel usage and safety margins • demonstrate the practical and theoretical aspects of navigation and apply this knowledge to a simulated flight 	<ul style="list-style-type: none"> • analyse the history of mapping, navigation and time-keeping and its application to aviation to identify standard practices • analyse features of charts used in aviation • use a range of navigation equipment to plan a flight and measure distance, direction and wind corrections • calculate time in flight and ground speed and use to predict fuel usage and safety margins • apply the practical and theoretical aspects of navigation o fly and then critique a simulated flight using computer software 	<ul style="list-style-type: none"> • understand the importance of mapping and navigation to safe flight • identify some features in the variety of charts used by navigators • use navigation rulers to measure distances and directions on a chart • operate computer software to control a simulated flight

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A course	T course	M course
Science Inquiry Skills		
<ul style="list-style-type: none"> • conduct research that explores the design, structure and operation of various types of navigation aids and equipment • conduct simple investigations into the types and uses of charts, including the correct use of equipment for plotting courses and measuring distances and speeds • apply workplace health and safety skills • represent data in meaningful and useful ways, including using appropriate SI units and symbols • use appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance 	<ul style="list-style-type: none"> • identify, research and construct questions that investigate the design and structure and operation of various types of navigation aids and equipment • design investigations, conduct risk assessments and consider research ethics into the types and uses of charts, including the correct use of equipment for plotting courses and measuring distances and speeds • apply workplace health and safety skills • represent and organise data in meaningful and useful ways, including using appropriate SI units and symbols, to identify trends, patterns and relationships • select, use and interpret appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance 	<ul style="list-style-type: none"> • participate in activities that explore navigation aids and equipment • investigate the various types of charts used in aviation • apply workplace health and safety skills • use correct units and symbols when recording navigation techniques
Science as a Human Endeavour		
<ul style="list-style-type: none"> • describe the history and development of navigation techniques • recognise the contribution of multiple individuals across disciplines such as astronomy, mathematics, geometry and geography to modern navigation techniques • recognise that social, economic, cultural and ethical considerations influence the adoption of new technology 	<ul style="list-style-type: none"> • critique the changes in the development of navigation techniques over time • critique the contribution of multiple individuals across disciplines such as astronomy, mathematics, geometry and geography to modern navigation techniques • analyse social, economic, cultural and ethical considerations that have influenced the adoption of new technology in aviation 	<ul style="list-style-type: none"> • identify the importance of latitude and longitude for mapping and navigation

A course	T course	M course
Science Understanding		
<ul style="list-style-type: none"> • demonstrate a knowledge of geodesy, cartography and navigation and apply to aviation planning • competently manipulate navigation devices to measure distance and ground speed • use graphical techniques to solve vector problems • use appropriate data tables to find navigation data including time differences from GMT, speed/time/distance calculations, fuel usage, and other calculations essential to safe flight • describe methods to determine aircraft position and groundspeed – using transit times (linear and angular) • demonstrate an understanding of the effect of wind on heading, track and drift • understand the basics of the properties of electromagnetic radiation – reflection, refraction, diffraction, absorption, ray-paths and their application to radio navigation 	<ul style="list-style-type: none"> • demonstrate and apply a depth and breadth of scientific and mathematical knowledge related to geodesy, cartography, navigation • investigate the types and uses of various devices to accurately measure distance and ground speed • use graphical analysis and interpretation of vectors to solve complex navigation problems • select appropriate mathematical operations to calculate navigation data including time differences from GMT, speed/time/distance calculations, fuel usage, and other calculations essential to safe flight • calculate aircraft position and groundspeed – using transit times (linear and angular) and apply corrections to regain track • accurately use vector algebra to calculate the effects of wind (headwind and crosswind) and the relationship between heading, track and drift • understand the fundamentals of the properties of electromagnetic radiation – reflection, refraction, diffraction, absorption, ray-paths and their application to radio navigation and sources of error – broadcast range, coastal refraction, terrain effect, night effect, mountain effect, co-channel interference, thunderstorm effect 	<ul style="list-style-type: none"> • correctly use simple navigation tools • read basic tables of data that are used to plan a flight • find a position on a chart and measure its distance from another point • understand that wind speed and direction affect flight

A course	T course	M course
<ul style="list-style-type: none"> • calculate position using ADF and Non-Directional Beacon (NDB) • describe the significance of a point of no return • plan a flight given specific parameters regarding range, wind, fuel and time calculations 	<ul style="list-style-type: none"> • calculate position using ADF and Non-Directional Beacon (NDB) • calculate point of no return • accurately plan a flight taking into account range, wind, fuel and time calculations 	<ul style="list-style-type: none"> • demonstrate an understanding of the concept of distance and bearing from a point • discuss things to consider when planning a flight

A guide to reading and implementing content descriptions

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A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 13-15.

Commercial Aviation**Value: 1.0****Commercial Aviation a****Value 0.5****Commercial Aviation b****Value 0.5****Unit Description**

In the following unit students will study specific aspects of the aviation industry and aircraft operation, including the operation of rotary wing aircraft. Students use maths in the quantitative and qualitative observations on the physics of flight. Students develop science inquiry skills and learn about science as a human endeavour.

Specific Unit Goals

This unit should enable students to:

A course	T course	M course
<ul style="list-style-type: none"> • describe examples of scientific knowledge relevant to the aviation industry • apply knowledge and understanding of aviation law and procedures to solve basic practical and theoretical problems of aircraft operation • describe the relationship between specific documents such as AIP and ERSA • demonstrate a basic understanding of flight planning requirements and official documents such as Flight Notifications and SAR times 	<ul style="list-style-type: none"> • demonstrate depth and breadth of scientific knowledge relevant to the aviation industry • critically research, analyse and evaluate aviation law and procedures from a variety of sources to solve practical and theoretical problems of aircraft operation • investigate the relationship between requirements outlined in legislation and a range of operational publications • apply an understanding of official documents such as Flight Notifications and SAR times to flight planning requirements 	<ul style="list-style-type: none"> • understand that scientific knowledge contributes to the development of aviation • demonstrate awareness of laws relating to aviation and specific documents such as AIP, CAR and CAO • describe the use of flight notifications and SAR times in flight planning

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A course	T course	M course
Science Inquiry Skills		
<ul style="list-style-type: none"> • research questions for investigation concerning the design and structure of aircraft; propose hypotheses; and predict possible outcomes arising from various designs 	<ul style="list-style-type: none"> • identify, research and construct questions for investigation concerning the design and structure of aircraft; propose hypotheses; and predict possible outcomes arising from various designs 	<ul style="list-style-type: none"> • formulate questions for investigation concerning the design and structure of aircraft. Make a simple hypothesis and predict possible outcomes

A course	T course	M course
<ul style="list-style-type: none"> • represent data in meaningful and useful ways, including using appropriate SI units and symbols • interpret and compare a range of aviation and media texts and identify important information by considering the quality of available evidence • use appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance 	<ul style="list-style-type: none"> • represent and organise data in meaningful and useful ways, including using appropriate SI units and symbols, to identify trends, patterns and relationships • investigate a range of aviation and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments • select, use and interpret appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance 	<ul style="list-style-type: none"> • use correct units and symbols when making calculations • explore a range of texts discussing aviation, including official and community media and compare each for reliability
Science as a Human Endeavour		
<ul style="list-style-type: none"> • describe the importance of aviation law to aircraft operations and safety • understand the role of Air Traffic Control and CENSAR in the maintenance of safety • discuss ethical, legal and environmental issues related to the safe use of aircraft • recognise that social, economic, cultural and ethical considerations influence the adoption of new technology • research and communicate ideas and information regarding commercial aviation and related topics using appropriate scientific terminology 	<ul style="list-style-type: none"> • analyse and critique the importance of aviation law to aircraft operations and safety • analyse and describe the roles of Air Traffic Control and CENSAR in the maintenance of safety and the obligation on pilots to maintain safe operations • critique the ethical, legal and environmental issues that influence the safe use of aircraft • identify social, economic, cultural and ethical considerations that have influenced the adoption of new technology in aviation • apply commercial aviation knowledge to predict and solve problems associated with the various classifications of commercial flying 	<ul style="list-style-type: none"> • provide examples of air law and how they impact on safety • recognise an environmental issue relating to use of aircraft

A course	T course	M course
<ul style="list-style-type: none"> • demonstrate an understanding of the practical and theoretical problems faced by commercial pilots using scientific methods to solve basic fuel and time problems associated with flying 	<ul style="list-style-type: none"> • understand the practical and theoretical problems faced by commercial pilots using scientific methods to solve basic fuel and time problems associated with flying 	
Science Understanding		
<ul style="list-style-type: none"> • describe the differences between licence types and the requirements for IFR flight • discuss the differences between MACH number and other measures of speed • describe the effect of bow waves in supersonic flight and how the sonic boom is generated • recognise and describe the differences between loading charts for small aircraft and those for larger commercial aircraft and helicopters • calculate climb, cruise and descent performance for specific aircraft • demonstrate Equi-Time Points and Point of No Return (ETP's and PNR's) and their importance for safety • describe the special design features of multi engine aircraft and their safety advantages and limitations • find examples of Australian air law and operational requirements using appropriate documents • recognise the importance of effective decision-making steps in workload management 	<ul style="list-style-type: none"> • explain the differences between licence types and the requirements for IFR flight • describe and calculate the differences between MACH number and other measures of speed • describe the effect of bow waves in supersonic flight and explain how the sonic boom is generated using principles drawn from the Doppler effect • analyse and apply complex loading and take-off performance charts (CPL level) for fixed-wing and rotary wing aircraft • calculate climb, cruise and descent performance for specific aircraft and apply to flight planning • calculate apply Equi-Time Points and Point of No Return (ETP's and PNR's) to flight planning tasks • investigate and explain the special design features related to multi engine aircraft and the consequent operational requirements • discuss the application of Air Law to specific operational requirements and limitations • identify factors in effective decision-making and cockpit workload management 	<ul style="list-style-type: none"> • understand that different types of licence exist • describe the effect of a sonic boom • complete simple loading charts • discuss the benefits of multi-engines

A course	T course	M course
<ul style="list-style-type: none"> • identify different helicopter structures and planforms and describe their uses • describe the use of controls such as the cyclic, the collective, the anti-torque pedals, and the throttle • describe the gyroscopic effects on rotary-wing craft, including precession and auto rotation • demonstrate an understanding of lift and drag for rotor blades and compare to wings • explore the ways in which hovering and forward flight are achieved by various types of rotary-wing aircraft • investigate operational reasons such as airspace limitations, altitudes, taxiing and circuit procedures for fixed-wing and rotary wing aircraft 	<ul style="list-style-type: none"> • research and explain helicopter structures and demonstrate understanding of the benefits of different planforms • compare various anti-torque configurations and controls such as the cyclic, the collective, the anti-torque pedals, and the throttle to fixed-wing aircraft • analyse the effects of torque and gyroscopic effects on rotary-wing craft, including precession, auto rotation and rotational velocities • demonstrate an understanding of lift and drag for rotor blades and pressure patterns produced by rotors • research and explain the effect of factors such as translational lift, transverse flow effect and retreating blade stall on aircraft performance • investigate the operational reasons for airspace limitations, altitudes, taxiing and circuit procedures for fixed-wing and rotary wing aircraft 	<ul style="list-style-type: none"> • discuss differences between helicopter types and fixed wing aircraft • compare the controls in fixed wing aircraft to those used in rotary wing aircraft • discuss the terms lift and drag as they apply to helicopters • understand and describe examples of airspace limitations in the vicinity of aerodromes

A guide to reading and implementing content descriptions

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A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 13-15.

Independent Study

Value: 1.0

Independent Study a

Value 0.5

Independent Study b

Value 0.5

Prerequisites

Independent Study units are only available to individual students in Year 12. A student can only study a maximum of one Independent Study unit in each course. Students must have studied at least three standard 1.0 units from this course. An Independent Study unit requires the principal's written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third 1.0 unit in this course of study.

Unit Description

An Independent Study unit has an important place in senior secondary courses. It is a valuable pedagogical approach that empowers students to make decisions about their own learning. An Independent Study unit can be proposed by an individual student for their own independent study and negotiated with their teacher. The program of learning for an Independent Study unit must meet the unit goals and content descriptions as they appear in the course.

Unit Goals

This unit should enable students to:

A Course	T Course	M Course
<ul style="list-style-type: none"> • analyse the theory and concepts underpinning the topic • apply concepts to solve problems in real world situations • use science inquiry skills to design, conduct and communicate investigations • communicate scientific concepts using appropriate scientific and aviation science terminology 	<ul style="list-style-type: none"> • analyse the theory underpinning the topic • evaluate and apply concepts to solve problems in real world situations • use science inquiry skills to design, conduct, evaluate and communicate investigations • communicate scientific concepts in a range of contexts using appropriate scientific terminology 	<ul style="list-style-type: none"> • describe the ideas underpinning the topic • conduct experiments • communicate scientific concepts using appropriate terminology

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A course	T course	M course
Science Inquiry Skills		
<ul style="list-style-type: none"> • identify, research and construct questions related to an area of interest in aviation science • collect, interpret and present data • apply workplace health and safety skills • research questions for investigation concerning the design and structure of aircraft; propose hypotheses; and predict possible outcomes arising from various designs • represent data in meaningful and useful ways, including using appropriate SI units and symbols • interpret and compare a range of aviation and media texts and identify important information by considering the quality of available evidence • use appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance 	<ul style="list-style-type: none"> • evaluate, identify, research and construct questions related to an area of interest in aviation science • interpret and present data • apply workplace health and safety skills • identify, research and construct questions for investigation concerning the design and structure of aircraft /space-craft; propose hypotheses; and predict possible outcomes arising from various designs • represent and organise data in meaningful and useful ways, including using appropriate SI units and symbols, to identify trends, patterns and relationships • interpret a range of aviation and media texts, and evaluate processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments • select, use and interpret appropriate mathematical models, including graphs and tables of data, to solve problems and make predictions concerning aircraft performance 	<ul style="list-style-type: none"> • research to answer questions related to the area of interest • apply workplace health and safety skills
Science as Human Endeavour		
<ul style="list-style-type: none"> • the use of scientific knowledge is influenced by social, economic, cultural and ethical considerations • the use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences 	<ul style="list-style-type: none"> • the use of scientific knowledge is influenced by social, economic, cultural and ethical considerations • the use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences 	<ul style="list-style-type: none"> • the use of scientific knowledge may have beneficial and/or harmful consequences

A course	T course	M course
<ul style="list-style-type: none"> scientific knowledge can enable scientists to offer valid explanations and make reliable predictions 	<ul style="list-style-type: none"> scientific knowledge can enable scientists to offer valid explanations and make reliable predictions 	
Science Understanding		
<ul style="list-style-type: none"> Explore a problem or area of interest in aviation science apply suitable information and communications technologies (ICT) when conducting their research and when presenting it to their audience reflect on the quality of work achieved and own learning 	<ul style="list-style-type: none"> identify a problem or area of interest in aviation science understand theoretical background to the problem understand the role of variables and the relationships between them in the context of their investigation evaluate and apply suitable information and communications technologies (ICT) when conducting their research and when presenting it to their audience evaluate decisions made in response to challenges specific to the investigation self evaluate the quality of the outcomes of the project and own associated learning 	<ul style="list-style-type: none"> demonstrate understanding of main issues in an area of interest in aviation use ICT to explore and present findings reflect on own learning

A guide to reading and implementing content descriptions

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A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

Assessment

Refer to pages 13-15.

Appendix A – Implementation Guidelines

Available course patterns

A standard 1.0 value unit is delivered over at least 55 hours. To be awarded a course, students must complete at least the minimum units over the whole minor, major, major/minor or double major course.

Course	Number of standard units to meet course requirements
Minor	Minimum of 2 units
Major	Minimum of 3.5 units

Units in this course can be delivered in any order.

Prerequisites for the course or units within the course:

Students must have studied at least three standard 1.0 units from this course in order to access the Independent Study unit. An Independent Study unit requires the principal's written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third or fourth 1.0 unit in this course of study.

Arrangements for students continuing study in this course

Students who studied the previous course may undertake any units in this course provided there is no duplication of content.

Duplication of Content Rules

Students cannot be given credit towards the requirements for a Senior Secondary Certificate for a unit that significantly duplicates content in a unit studied in another course. The responsibility for preventing undesirable overlap of content studied by a student rests with the principal and the teacher delivering the course. Students will only be given credit for covering the content once.

Guidelines for Delivery

Program of Learning

A program of learning is what a school provides to implement the course for a subject. This meets the requirements for context, scope and sequence set out in the Board endorsed course. Students follow programs of learning in a college as part of their senior secondary studies. The detail, design and layout of a program of learning are a college decision.

The program of learning must be documented to show the planned learning activities and experiences that meet the needs of particular groups of students, taking into account their interests, prior knowledge, abilities and backgrounds. The program of learning is a record of the learning experiences that enable students to achieve the knowledge, understanding and skills of the content descriptions. There is no requirement to submit a program of learning to the OBSSS for approval. The Principal will need to sign off at the end of Year 12 that courses have been delivered as accredited.

Content Descriptions

Are all content descriptions of equal importance? No. It depends on the focus of study. Teachers can customise their program of learning to meet their own students' needs, adding additional content descriptions if desired or emphasising some over others. A teacher must balance student needs with their responsibility to teach all content descriptions. It is mandatory that teachers address all content descriptions and that students engage with all content descriptions.

Half standard 0.5 units

Half standard units appear on the course adoption form but are not explicitly documented in courses. It is at the discretion of the college principal to split a standard 1.0 unit into two half standard 0.5 units. Colleges are required to adopt the half standard 0.5 units. However, colleges are not required to submit explicit documentation outlining their half standard 0.5 units to the BSSS. Colleges must assess students using the half standard 0.5 assessment task weightings outlined in the framework. It is the responsibility of the college principal to ensure that all content is delivered in units approved by the Board.

Moderation

Moderation is a system designed and implemented to:

- provide comparability in the system of school-based assessment
- form the basis for valid and reliable assessment in senior secondary schools
- involve the ACT Board of Senior Secondary Studies and colleges in cooperation and partnership
- maintain the quality of school-based assessment and the credibility, validity and acceptability of Board certificates.

Moderation commences within individual colleges. Teachers develop assessment programs and instruments, apply assessment criteria, and allocate Unit Grades, according to the relevant Course Framework. Teachers within course teaching groups conduct consensus discussions to moderate marking or grading of individual assessment instruments and unit grade decisions.

The Moderation Model

Moderation within the ACT encompasses structured, consensus-based peer review of Unit Grades for all accredited courses over two Moderation Days. In addition to Moderation Days, there is statistical moderation of course scores, including small group procedures, for T courses.

Moderation by Structured, Consensus-based Peer Review

Consensus-based peer review involves the review of student work against system wide criteria and standards and the validation of Unit Grades. This is done by matching student performance with the criteria and standards outlined in the Achievement Standards, as stated in the Framework. Advice is then given to colleges to assist teachers with, or confirm, their judgments. In addition, feedback is given on the construction of assessment instruments.

Preparation for Structured, Consensus-based Peer Review

Each year, teachers of Year 11 are asked to retain originals or copies of student work completed in Semester 2. Similarly, teachers of a Year 12 class should retain originals or copies of student work completed in Semester 1. Assessment and other documentation required by the Office of the Board of Senior Secondary Studies should also be kept. Year 11 work from Semester 2 of the previous year is presented for review at Moderation Day 1 in March, and Year 12 work from Semester 1 is presented for review at Moderation Day 2 in August.

In the lead up to Moderation Day, a College Course Presentation (comprised of a document folder and a set of student portfolios) is prepared for each A, T and M course/units offered by the school and is sent into the Office of the Board of Senior Secondary Studies.

The College Course Presentation

The package of materials (College Course Presentation) presented by a college for review on Moderation Days in each course area will comprise the following:

- a folder containing supporting documentation as requested by the Office of the Board through memoranda to colleges, including marking schemes and rubrics for each assessment item
- a set of student portfolios containing marked and/or graded written and non-written assessment responses and completed criteria and standards feedback forms. Evidence of all assessment responses on which the Unit Grade decision has been made is to be included in the student review portfolios.

Specific requirements for subject areas and types of evidence to be presented for each Moderation Day will be outlined by the Board Secretariat through the *Requirements for Moderation Memoranda* and Information Papers.

Visual evidence for judgements made about practical performances

It is a requirement that schools' judgements of standards to practical performances (A/T/M) be supported by visual evidence (still photos or video).

The photographic evidence submitted must be drawn from practical skills performed as part of the assessment process.

Teachers should consult the BSSS website for current information regarding all moderation requirements including subject specific and photographic evidence.

Appendix B – Course Developers

Name	College
David Baker	Gungahlin College

We gratefully acknowledge the work of previous course developers:

Gary Lawson, Peter Smythe, Joshua Garretson, David Edmunds, Eric Gibbings, John Hill

Appendix C – Common Curriculum Elements

Common curriculum elements assist in the development of high-quality assessment tasks by encouraging breadth and depth and discrimination in levels of achievement.

Organisers	Elements	Examples
create, compose and apply	apply	ideas and procedures in unfamiliar situations, content and processes in non-routine settings
	compose	oral, written and multimodal texts, music, visual images, responses to complex topics, new outcomes
	represent	images, symbols or signs
	create	creative thinking to identify areas for change, growth and innovation, recognise opportunities, experiment to achieve innovative solutions, construct objects, imagine alternatives
	manipulate	images, text, data, points of view
analyse, synthesise and evaluate	justify	arguments, points of view, phenomena, choices
	hypothesise	statement/theory that can be tested by data
	extrapolate	trends, cause/effect, impact of a decision
	predict	data, trends, inferences
	evaluate	text, images, points of view, solutions, phenomenon, graphics
	test	validity of assumptions, ideas, procedures, strategies
	argue	trends, cause/effect, strengths and weaknesses
	reflect	on strengths and weaknesses
	synthesise	data and knowledge, points of view from several sources
	analyse	text, images, graphs, data, points of view
	examine	data, visual images, arguments, points of view
investigate	issues, problems	
organise, sequence and explain	sequence	text, data, relationships, arguments, patterns
	visualise	trends, futures, patterns, cause and effect
	compare/contrast	data, visual images, arguments, points of view
	discuss	issues, data, relationships, choices/options
	interpret	symbols, text, images, graphs
	explain	explicit/implicit assumptions, bias, themes/arguments, cause/effect, strengths/weaknesses
	translate	data, visual images, arguments, points of view
	assess	probabilities, choices/options
	select	main points, words, ideas in text
identify, summarise and plan	reproduce	information, data, words, images, graphics
	respond	data, visual images, arguments, points of view
	relate	events, processes, situations
	demonstrate	probabilities, choices/options
	describe	data, visual images, arguments, points of view
	plan	strategies, ideas in text, arguments
	classify	information, data, words, images
	identify	spatial relationships, patterns, interrelationships
	summarise	main points, words, ideas in text, review, draft and edit

Appendix D – Glossary of Verbs

Verbs	Definition
Analyse	Consider in detail for the purpose of finding meaning or relationships, and identifying patterns, similarities and differences
Apply	Use, utilise or employ in a particular situation
Argue	Give reasons for or against something
Assess	Make a Judgement about the value of
Classify	Arrange into named categories in order to sort, group or identify
Compare	Estimate, measure or note how things are similar or dissimilar
Compose	The activity that occurs when students produce written, spoken, or visual texts
Contrast	Compare in such a way as to emphasise differences
Create	Bring into existence, to originate
Critically analyse	Analysis that engages with criticism and existing debate on the issue
Demonstrate	Give a practical exhibition an explanation
Describe	Give an account of characteristics or features
Discuss	Talk or write about a topic, taking into account different issues or ideas
Evaluate	Examine and judge the merit or significance of something
Examine	Determine the nature or condition of
Explain	Provide additional information that demonstrates understanding of reasoning and /or application
Extrapolate	Infer from what is known
Hypothesise	Put forward a supposition or conjecture to account for certain facts and used as a basis for further investigation by which it may be proved or disproved
Identify	Recognise and name
Interpret	Draw meaning from
Investigate	Planning, inquiry into and drawing conclusions about
Justify	Show how argument or conclusion is right or reasonable
Manipulate	Adapt or change
Plan	Strategize, develop a series of steps, processes
Predict	Suggest what might happen in the future or as a consequence of something
Reflect	The thought process by which students develop an understanding and appreciation of their own learning. This process draws on both cognitive and affective experience
Relate	Tell or report about happenings, events or circumstances
Represent	Use words, images, symbols or signs to convey meaning
Reproduce	Copy or make close imitation
Respond	React to a person or text
Select	Choose in preference to another or others
Sequence	Arrange in order
Summarise	Give a brief statement of the main points
Synthesise	Combine elements (information/ideas/components) into a coherent whole
Test	Examine qualities or abilities
Translate	Express in another language or form, or in simpler terms
Visualise	The ability to decode, interpret, create, question, challenge and evaluate texts that communicate with visual images as well as, or rather than, words

Appendix E – Glossary for ACT Senior Secondary Curriculum

Courses will detail what teachers are expected to teach and students are expected to learn for year 11 and 12. They will describe the knowledge, understanding and skills that students will be expected to develop for each learning area across the years of schooling.

Learning areas are broad areas of the curriculum, including English, mathematics, science, the arts, languages, health and physical education.

A **subject** is a discrete area of study that is part of a learning area. There may be one or more subjects in a single learning area.

Frameworks are system documents for Years 11 and 12 which provide the basis for the development and accreditation of any course within a designated learning area. In addition, frameworks provide a common basis for assessment, moderation and reporting of student outcomes in courses based on the framework.

The **course** sets out the requirements for the implementation of a subject. Key elements of a course include the rationale, goals, content descriptions, assessment, and achievement standards as designated by the framework.

BSSS courses will be organised into units. A unit is a distinct focus of study within a course. A standard 1.0 unit is delivered for a minimum of 55 hours generally over one semester.

Core units are foundational units that provide students with the breadth of the subject.

Additional units are avenues of learning that cannot be provided for within the four core 1.0 standard units by an adjustment to the program of learning.

An **Independent Study unit** is a pedagogical approach that empowers students to make decisions about their own learning. Independent Study units can be proposed by a student and negotiated with their teacher but must meet the specific unit goals and content descriptions as they appear in the course.

An **elective** is a lens for demonstrating the content descriptions within a standard 1.0 or half standard 0.5 unit.

A **lens** is a particular focus or viewpoint within a broader study.

Content descriptions refer to the subject-based knowledge, understanding and skills to be taught and learned.

A **program of learning** is what a college develops to implement the course for a subject and to ensure that the content descriptions are taught and learned.

Achievement standards provide an indication of typical performance at five different levels (corresponding to grades A to E) following completion of study of senior secondary course content for units in a subject.

ACT senior secondary system **curriculum** comprises all BSSS approved courses of study.

Appendix F – Resources to support Implementation

Bibliography

There is no prescribed text-book for student use. The following are books on hand which contain the types of treatment and depths of understandings appropriate to this course.

Books

Anderson, D. F., & Eberhardt, s. (2010). *Understanding flight*. New York, McGraw-Hill.

Avery, R., 1999, *ATPL performance & loading: reference and text*, Bassendean, W. Aust.: Avfacts.

Aviation Supplies & Academics, I., 2008, *Access to flight: integrated private and instrument curriculum*, Newcastle, Wash.: Aviation Supplies & Academics.

Aviation Theory Centre (Melbourne, Vic.) 2012a, *Aircraft general knowledge and aerodynamics for the CASA PPL and CPL day VFR syllabus*, Huntingdale, Vic.: Aviation Theory Centre.

Aviation Theory Centre (Melbourne, Vic.) 2012b. *Meteorology and navigation for the CASA PPL and CPL day VFR syllabus*, Cheltenham, Vic.: Aviation Theory Centre.

Bagshaw, M., 2009. *Human Performance and Limitations in Aviation*, Blackwell Publishing.

Ball, Jerry. (2008). *The impact of training on general aviation pilots' ability to make strategic weather-related decisions*. Available at:
http://permanent.access.gpo.gov/LPS105841/LPS105841/www.faa.gov/library/reports/medical/oam_techreports/2000s/media/200803.pdf

Barnhart, R. K. (2012). *Introduction to unmanned aircraft systems*. Boca Raton, Fla, CRC.

Beard, R. W., & Mclain, T. W. (2012). *Small Unmanned Aircraft Theory and Practice*. Princeton, Princeton University Press.

Blunden, M., 2009a, *Cessna 152*, Hertfordshire: Pooleys Flight Equipment,

Blunden, M., 2009b, *Piper warrior PA28*, Hertfordshire: Pooleys Flight Equipment,

Cockburn, D. & Cockburn, D., 2007. *Human performance for private pilots; and Communications theory for private pilots*, Cranfield: Air Pilot Publishing,

Kershner, W.K. & Kershner, W. C., 2010. *The student pilot's flight manual: from first flight to pilot certificate*, Newcastle, Wash.; Lancaster: Aviation Supplies & Academics; Gazelle [distributor].

NASA Center for AeroSpace Research. & Rehfield, L., *Modeling and design analysis methodology for tailoring of aircraft structures with composites*, California: NASA

Nolan, M. S. (2011). *Fundamentals of air traffic control*. Clifton Park, N.Y., Delmar Cengage Learning.

Robson, D. & Aviation Theory Centre (Williamstown, Vic.) 2009, *Aircraft general knowledge and aerodynamics for the private and commercial pilot licences*, Huntingdale, Vic.: Aviation Theory Centre,

Robson, D. (2009). *Basic aeronautical knowledge (BAK)*. Darra, Qld, Aviation Theory Centre.

Robson, D. & Pooley, D., 2009, *Instrument flying, radio navigation aids, instrument procedures, night flying, IMC rating, night qualification*, Beds, England: Air Pilot Pub.

Thom, T. & Aviation Theory Centre (Melbourne, Vic.) 2009, *Aeroplane operation, performance and planning for the private pilot licence and commercial pilot licence*, Williamsstown, Vic.: Aviation Theory Centre.

Tooley, M. H., & Wyatt, D. (2007). *Aircraft communications and navigation systems: principles, operation and maintenance*. Amsterdam, Elsevier/Butterworth-Heinemann.

Tait, Bob & Bob Tait's Aviation Theory School 2009, **Command instrument rating: a home study course for the CASA Instrument Rating Examination (IREX)**.

Feinberg, Arthur (2002) **NASA aviation safety program weather accident prevention**. In:

Feinberg, Arthur and Tauss, James **Weather information communications [WINCOMM]**. Cleveland, Ohio: National Aeronautics and Space Administration, Glenn Research Center.

Levy, Matthys 2007, **Why the wind blows: a history of weather and global warming**, Upper Access, Hinesburg, VT

DVDs and Video

Australia. Civil Aviation Safety Authority 2009, **Look out! Situational awareness**, Civil Aviation Safety Authority, Canberra

Australia. Civil Aviation Safety Authority 2005, **Weather to fly**, Civil Aviation Safety Authority, Canberra

Aviation Science

Aviation Supplies & Academics, Inc 2008, **Access to flight: integrated private and instrument curriculum**, Aviation Supplies & Academics, Newcastle, Wash

Aviation Theory Centre (Melbourne, Vic.) 2012a, **Aircraft general knowledge and aerodynamics for the CASA PPL and CPL day VFR syllabus**, Huntingdale, Vic.: Aviation Theory Centre.

Thom, Trevor & Aviation Theory Centre (Melbourne, Vic.) 2001, **Aeroplane operation, performance and planning for the private pilot licence and commercial pilot licence**, Aviation Theory Centre, South Melbourne, Vic

CD ROMS

Rags Sticks and Wire (Audio), ABC Science Unit Australia. Civil Aviation Safety Authority 2009, **Look out! Situational awareness**, Civil Aviation Safety Authority, Canberra

Journals

Flight Safety Australia, Civil Aviation Safety Authority, 2012

Audio visual Material

4 Corners "The Lockhart River disaster" 2005

Websites

<http://www.casa.gov.au>

Meteorology and Human factors

Aviation Theory Centre (Melbourne, Vic.) 2012b. **Meteorology and navigation for the CASA PPL and CPL day VFR syllabus**, Cheltenham, Vic.: Aviation Theory Centre.

Bagshaw, M., 2009. **Human Performance and Limitations in Aviation**, Blackwell Publishing.

Ball, Jerry. (2008). **The impact of training on general aviation pilots' ability to make strategic weather-related decisions**. Available:

http://permanent.access.gpo.gov/LPS105841/LPS105841/www.faa.gov/library/reports/medical/oam_techreports/2000s/media/200803.pdf

Cockburn, D. & Cockburn, D., 2007. **Human performance for private pilots; and Communications theory for private pilots**, Cranfield: Air Pilot Publishing,

Levy, Matthys 2007, **Why the wind blows: a history of weather and global warming**, Upper Access, Hinesburg, VT

CD ROM

Australia. Civil Aviation Safety Authority 2005, ***Weather to fly***, Civil Aviation Safety Authority, Canberra www.bom.gov.au

Navigation and Flight Planning

Maps (WACs)

Flight Computers

Navigational Plotters

Flight Simulator

AirServices Australia syllabus

CAO Regulations and Orders

ERSA

Commercial Aviation

Maps (VTC, PCA, WAC, VNC)

Flight Computers

Navigational Plotters

Flight Simulator

AirServices Australia syllabus

CAO Regulations and Orders

ERSA

Avery, R., 1999, ***ATPL performance & loading: reference and text***, Bassendean, W. Aust.: Avfacts.

Thom, T. & Aviation Theory Centre (Melbourne, Vic.) 2009, ***Aeroplane operation, performance and planning for the private pilot licence and commercial pilot licence***, Williamstown, Vic.: Aviation Theory Centre.

Jackson, Robert, 1941- 2006, ***Helicopters: modern civil and military rotorcraft***, Amber, London

Langley, Andrew 2010, ***Helicopters***, Franklin Watts, London

Smith, Dick & Bennett, Jack, 1934- & Wright, Ramsay 1994, ***The earth beneath me***, Australian Listening Library, Sydney

2006. ***Straight up helicopters in action***, Visual Entertainment Group [distributor], Richmond South, Vic

Zuehlke, Jeffrey 2005, ***Helicopters***, Lerner Publications Co, Minneapolis, MN

Zuehlke, Jeffrey 2011, ***Helicopters on the move***, Lerner Pub. Group, Minneapolis, MN

Appendix G – Course Adoption

Conditions of Adoption

The course and units of this course are consistent with the philosophy and goals of the college and the adopting college has the human and physical resources to implement the course.

Adoption Process

Course adoption must be initiated electronically by an email from the principal or their nominated delegate to bssscertification@ed.act.edu.au. A nominated delegate must CC the principal.

The email will include the **Conditions of Adoption** statement above, and the table below adding the **College** name, and circling the **Classification/s** required.

College:	
Course Title:	Flight
Classification/s:	A T M
Accredited from:	2018
Framework:	Science 2020