

<b>Subject Title:</b>	General Science Secondary Curriculum 1		
<b>Subject Code:</b>	EDU4GS1	<b>Credit Points:</b>	
<b>Teaching Period:</b>	Trimester 1	<b>Mode:</b>	Blended
<b>Prerequisite:</b>	15	<b>Level:</b>	4
<b>Subject Description:</b>			
<p>This subject is only undertaken by pre-service teachers who are studying two separate science methods (two of the following methods: Biology, Chemistry, General Science, and Physics).</p> <p>In this subject knowledge and skills are developed about pedagogical content knowledge, planning, implementation, assessment and reporting, and reflection, which are taken further into interdisciplinary, STE(A)M, social issue(s), active science at work and publishing directions. There is student choice involved as the focus in this subject to individualise the learning. The emphasis is on effective teaching and learning within an Australian context for Science Years 7-10, drawing upon the examples of current curriculum and professional frameworks. This subject builds on the content from STM1.</p> <p>Pre-service teachers consider, demonstrate and reflect upon a professional understanding of teaching method-specific concepts, issues and developments, safety, where applicable, and legal responsibilities, application of learning technologies, audio-visual materials, and resources.</p>			
<b>Intended Learning Outcomes (ILOs) &amp; Australian Professional Standards for Teachers (APST)</b>			
Upon successful completion of this subject, you will be able to:		APST	
1	Demonstrate knowledge of the concepts, skills, structure of the content and teaching strategies of Science Education, and an in-depth understanding of how students learn in Science.	1.2, 2.1	
2	Critically analyse, plan and synthesise, a range of Science learning and teaching activities and sequences for junior secondary students that involve a variety of pedagogical approaches and resources (including safe and ethical pedagogy and use of resources including ICT) appropriate to state and national curricula.	1.2, 2.2, 2.6, 3.1, 3.2, 3.3, 3.4, 4.4, 4.5	
3	Describe, design, and evaluate a unit of work involving a variety of teaching strategies that cater for individual differences in student learning (across a range of abilities) and integrate capabilities and priorities of state and/or national curriculum in Science Education.	1.5, 2.4, 2.5, 2.6, 3.3, 4.1, 5.3, 5.4	
4	Examine the relationships between assessment, feedback and reporting, learning task design, student engagement and knowledge and skills to be developed in Science, and apply to the requirements of curriculum documents.	2.3, 3.6, 5.1, 5.2	

<b>Assessment:</b>				
Assessment Summary		Word Count Equivalence	%	APST
1	Task 1: Curriculum-based Integrated Unit Plan	1800	40	1.2, 1.5, 2.1, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3, 3.4, 3.6, 4.1, 4.4, 4.5, 5.1, 5.2, 5.3, 5.4
2	Task 2 (Option a or b)	1800	40	1.2, 2.1, 2.6, 3.4
3	Task 3: Reflective Journal	900	20	1.2, 2.4, 2.5, 2.6, 3.3, 4.1, 5.1, 5.2, 5.3, 5.4
Assessment Details (including Assessment Criteria)				
1	<p><b>Task 1: Curriculum-based Integrated Unit Plan</b>            Pre-service teachers will develop an interdisciplinary science topic for Years 7-10 teaching. This should have a STE(A)M emphasis. It will present engagement in Science and view Science as a future subject in Year 11 and 12 students. There should be integration of Science disciplines. One lesson should be presented using the La Trobe University lesson plan. Aspects of diagnostic, formative and summative assessment should be presented within the topic and appropriately in the lesson plan. This can be develop using a contextual theme from an inspirational social and contemporary issue, a website of interested or a segment from a documentary. This must be referenced as the initial starting point and can be recognised as a unit that evolved from a “teachable moment”. Awareness of the social, economic and political context should be integrated into the understandings developed in the unit.</p>			
2	<p>(For those with a full junior Science Method do Task 2a and 2b)</p> <p><b>Task 2a Science in Action</b></p> <p>Identify someone you know who uses science in their work. Alternatively, if you know a scientist this person’s work also presents a suitable starting point. You will need to outline the active science this person works with and indicate how you could break down the ideas and concepts to teach in the Year 7-10 curriculum.</p> <p><b>Assessment Criteria</b></p> <ol style="list-style-type: none"> <li>1. Provide a comprehensive vision of how this can be taken into teaching and design appropriate the teaching tools such that other teachers in secondary teaching can teach active science for understanding.</li> </ol> <p><b>OR/AND Task 2b</b></p> <p><b>Task 2b: Case Study of Issue/Teaching Resources (Produce and Publish)</b></p> <p>Pre-service teachers will select a topic of concern to them (an Issue in Science Education) to research and report upon in a scholarly manner. Suggestions will be given as a guide and previously published articles provided as exemplars. This is a teacher as researcher approach where we look to current published literature and use reflective practice to apply the theory we encounter in our future practice. Pre-service teachers will write an article to be published in a Science Professional Association that addresses the issue selected. This sets both the audience and the expected mode of communication. To scaffold quality writing, pre-service teachers will design a narrated PowerPoint that outlines the key points as both a summary of the content, a means for sharing and an article plan. Pre-service teachers will peer-review each narrated Case Study PowerPoint and provide a brief response based on the readings and the Module materials.</p> <p><b>Assessment Criteria</b></p> <p>In the final article produced there should be:</p> <ol style="list-style-type: none"> <li>1. Evidence of appropriate current reading</li> <li>2. The topic addressed with breadth and depth</li> </ol>			

	<ol style="list-style-type: none"> <li>3. Evidence of insight, originality and a clear stance taken for future science teaching pedagogy</li> <li>4. Strong links to the content covered in tutorials and intensives</li> <li>5. Calibre of writing, including the use of academic referencing for journal publication</li> </ol> <p>Formative written feedback and rubric assessment will be provided in response to each task.</p>
3	<p><b>Task 3: Reflective Journal</b></p> <p>This reflection is to express, justify and support (with high-quality resources and evidence) your developing professional and pedagogical beliefs, in a manner and mode appropriate to your selected Method area. You will develop a concise professional statement that demonstrates an informed, coherent philosophy and pedagogical stance in your teaching method. This should show what matters to you and how you intend to teach this subject in schools.</p> <p>This reflection task will allow you to demonstrate critical consideration of ideas and issues explored through face-to-face and online activities, ongoing participation in the method subject, careful analysis of self as teacher, and personal and professional reflection. In order to compile your ideas and response to this task, you should ensure that you engage in critical personal reflection regarding your developing professionalism and pedagogy. You should record reflective responses throughout this trimester, as this is your first opportunity to explore your selected Method areas within your pedagogical and curricular frame.</p> <p>From the commencement of trimester 2, you are strongly encouraged to record:</p> <ol style="list-style-type: none"> <li>a) Reflective responses to face-to-face intensive classes;</li> <li>b) Reflective responses recorded throughout online modules; and a</li> <li>c) Reflective professional statement completed upon conclusion of other assessments and online requirements.</li> </ol> <p>Throughout the trimester and when developing your statement, you should critically reflect on:</p> <ul style="list-style-type: none"> <li>• Literature and research in your subject area;</li> <li>• Course materials you have considered in the online modules and intensive workshops;</li> <li>• The portfolio of ideas and responses you developed during the modules in this subject; and</li> <li>• Your professional experiences in schools.</li> </ul> <p>This reflection is just the beginning of an ongoing reflective journal that should provide evidence of your development as a critically reflective practitioner; this is a valuable tool as a pre-service teacher and will be useful as you collate a professional folio towards the end of your course. You will be required to undertake additional reading to develop and support your reflection.</p> <p>The finished product of your reflection may take different forms for each Method. It should include a digital component – whether in reference to the impact of digital technologies in your Method area, or the mode of delivery of your reflection. It might include a reflective journal that demonstrates how you have developed your knowledge and skills by participating in the various online and face-to-face activities in the modules and intensives. The mode of your expression and delivery will be further specified and explained during Intensive 2 and/or via LMS. Your Reflection should include Method-specific observations or reflections from your professional experience/s to date.</p> <p><b>Assessment Criteria</b></p> <p>The grading criteria for this task focus on the areas of:</p> <ol style="list-style-type: none"> <li>1. Critical reflection on philosophy and pedagogy within the selected Method area;</li> <li>2. Development of a professional statement;</li> <li>3. Effective, scholarly, research-based expression.</li> </ol>

<b>Learning Resources</b>	
<b>Required Texts</b>	
1	Venville, G. and Dawson, V. (2012) The Art of Teaching Science For idle and Secondary School (2 <sup>nd</sup> Ed.) Allen and Unwin
<b>Recommended Reading</b>	
1	Lecture produced notes: <a href="http://youtu.be/7Fql2aWJadM">http://youtu.be/7Fql2aWJadM</a> and <a href="http://youtu.be/B1BBEyKI1Yk">http://youtu.be/B1BBEyKI1Yk</a>
2	VCAA Scope and Sequence Chart: <a href="http://victoriancurriculum.vcaa.vic.edu.au/science/introduction/scope-and-sequence">http://victoriancurriculum.vcaa.vic.edu.au/science/introduction/scope-and-sequence</a>
3	VCAA F-10 Curriculum Link: <a href="http://victoriancurriculum.vcaa.vic.edu.au/science/introduction/rationale-and-aims">http://victoriancurriculum.vcaa.vic.edu.au/science/introduction/rationale-and-aims</a>
4	Science Awareness and Scientific Literacy – Leonie Rennie: <a href="https://lms.latrobe.edu.au/pluginfile.php/2428978/mod_book/chapter/115445/Rennie%282005%29.pdf">https://lms.latrobe.edu.au/pluginfile.php/2428978/mod_book/chapter/115445/Rennie%282005%29.pdf</a>
5	Junior Science Text books including but not exclusive to publishers such as: Jacaranda, Oxford, Nelson and Macmillan

Learning Activities Overview:		
Week	Learning Topic	Learning Activities/Readings
1	Introduction, Extending Content Knowledge, STE(A)M Resources	Extended History of Science. Resources for teaching Integrated Science  Reading: Murdoch
2	Exploring Integrated Science Curriculum: P-10	Introduction to Integrated Science Curricula in the Australian and Victorian context including STEAM <ul style="list-style-type: none"> <li>• Big ideas that underpin integrated curricula</li> <li>• Explore structure and content of exemplar units</li> </ul> Reading: Venville, G. and Dawson, V. (2012) Ch. 7 The Australian Science Curriculum
3	Assessment and Reporting in Integrated Science Curriculum	Assessment and Reporting in Integrated Science Curriculum Practice at assessment and moderation of integrated student work
4	Integrated Curriculum: Teaching and Learning Sustainability	Sustainability concepts, Teaching and Learning using Integrated Sustainability Curriculum Frameworks Reading: Sustainability Curriculum Framework: A Guide for Curriculum Developers and Policy Makers, Australian Government Department of the Environment, Water, Heritage and Arts
5	Integrated Curriculum Planning	Integrated Curriculum Planning in schools Lesson and unit planning, templates and the 5Es (Extended exploration) Reading: Venville, G. and Dawson, V. (2012) Ch. 5 Planning in Secondary Science
6	Inquiry and Investigations in STEAM	Effective approaches in STEAM classrooms. Excursions, incursions, taking students outdoors, Exploration of Resources Readings: Venville, G. and Dawson, V. (2012) Ch. 6 Inquiry and Investigations in Science , Ch. 9 Student Engagement in Science Lessons & Ch. 10 Developing a 'Thinking' Science Curriculum
7	Teaching and Learning Strategies in Integrated STE(A)M Classrooms	Teaching and Learning Strategies in Integrated STE(A)M Classrooms.  Reading: Venville, G. and Dawson, V. (2012) Ch. 4 Teaching Strategies for Science Classrooms
8	ICT, Literacy and Numeracy in Science, Cross Curricular Priorities and General Capabilities	Detailed exploration of ICT, Literacy and Numeracy in Science, Cross Curricular Priorities and General Capabilities Reading: Venville, G. and Dawson, V. (2012) Ch. 11 ICT in the Science Classroom
9	Individualised Task 2 Investigation Program	Pre-service teachers investigate and report on individualised Task 2 Program
10	Individualised Task 2 Investigation Program	Pre-service teachers investigate and report on individualised Task 2 Program
11	Individualised Task 2 Investigation Program	Pre-service teachers investigate and report on individualised Task 2 Program
12	Individualised Task 2 Investigation Program	Pre-service teachers investigate and report on individualised Task 2 Program

<b>Assessment</b>	
<b>Assessment Task No.</b>	<b>Description of task:</b>
1	Curriculum-based Integrated Unit Plan
<b>APST</b>	<b>Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed</b>
1.2, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3, 3.4, 3.6, 4.1, 4.4, 4.5	<p>Taught – Academic content covered weeks 1- 8 of the semester.</p> <p>Practiced – During the first 8 weeks of the online modules in the program PSTs encounter resources, practices and theory of integrated teaching in the STEM/STEAM and sustainability fields as a means to engage with interdisciplinarity in Science teaching. Experience of the writing, exemplars and topical areas where integrated curriculum is encountered in the practices of science learning and teaching will provide the backbone for inquiry and experiential learning, which one can present when teaching to reach diversity in student cohorts.</p> <p>Assessed – Assessment Task 1</p>
<b>Assessment Task No</b>	<b>Description of task:</b>
2	Option a or b: a) Science in Action or b) Case Study of Issue/Teaching Resources (Produce and Publish)
<b>APST</b>	<b>Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed</b>
1.2, 2.1, 2.6, 3.4	<p>Taught – Academic content covered weeks 1-8 of the semester as first stage learning and 9-12 through peer interaction.</p> <p>Practiced – With the background understanding of the integrated curriculum studies in the science field PSTs use the skills and recognition of practices they have encountered in scientists or science related professions they know to dissect the role of someone who work in a science field as a case study for future Year 7-10 teaching. Alternatively, given the same starting point of the course investigate both the theoretical and practical aspects of an issue in science teaching for an audience of peers. Both contexts are research based a generating a product that understands curriculum and presents how students learn from enacted real science examples to embed into science teaching.</p> <p>Assessed - Assessment Task 2</p>
<b>Assessment Task No</b>	<b>Description of task:</b>
3	Reflective Journal
<b>APST</b>	<b>Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed</b>
1.2, 2.4, 2.5, 2.6, 3.3, 4.1, 5.1, 5.2, 5.3, 5.4	<p>Taught – Academic content covered weeks 1-12 of the semester.</p> <p>Practiced – Given the encounters of online discussions, postings from peers, weekly module activities over the semester, PSTs now present a re-cap of the subject and a coherent stance from their encounters in the subject in the context of teaching Science. This includes the sharing ideology in a sequence of presentations of Task 2, which answers now both the questions of where is science in present day life and pinpoints and theoretically discusses issues of paramount importance to the Science PST.</p> <p>Assessed - Assessment Task 3</p>