

COURSE OUTLINE

YR12 EARTH AND ENVIRONMENTAL SCIENCE ATAR: 2022

UNIT 3 AND UNIT 4

This course will run the two units, 3 and 4, concurrently. The student Semester 1 grade will therefore be an estimate.

Term	Wk	Topic and key teaching points	Syllabus content	Resources	Assessment
1	W1	<ul style="list-style-type: none"> Metamorphic Rocks Cross Sections <i>Metamorphic Rocks tray</i> 	<ul style="list-style-type: none"> identify and classify metamorphic rocks based on texture and mineralogy from physical samples, diagrams, and photographs select, construct and interpret appropriate representations, including maps and geological cross-sections where the section line is perpendicular to strike, and other spatial representations such as block diagrams and stratigraphic columns, to communicate conceptual understanding, solve problems and make predictions 	Pg 66 – 80 Pg 82-97 + ESWA booklet	
1	W2	<ul style="list-style-type: none"> Exploration and Extraction 	<ul style="list-style-type: none"> Exploration - location of non-renewable mineral and energy resources, including fossil fuels, iron ore, nickel and gold, is related to their geological setting, including sedimentary, magmatic, metamorphic and hydrothermal processes mineral and energy resources are discovered using a variety of techniques, including mapping, satellite images, aerial photographs, geophysical and geochemical methods, to identify the spatial extent of the deposit and quality of the resource 	<ul style="list-style-type: none"> Pg 18-40 	

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			<ul style="list-style-type: none"> geological and geophysical techniques (measuring magnetic fields and electromagnetic induction) and remote sensing technologies (including aerial photography, satellite based spectroscopes have increased the rate of identification of mineral and energy resources and improved estimates of their size and value environmental considerations are important in the exploration, extraction and processing of non-renewable resources, and the decommissioning of resource sites Extraction of minerals resources influences the interaction between the abiotic and biotic components of ecosystems including hydrological systems select, construct and interpret appropriate representations, including maps and geological cross-sections, and others such as block diagrams and stratigraphic columns 		
1	W3	<ul style="list-style-type: none"> Non-renewable resources Magmatic ores – Nickel, Gold 	<ul style="list-style-type: none"> non-renewable mineral and energy resources are formed over geological timescales the location of non-renewable mineral and energy resources, including fossil fuels, iron ore, nickel and gold, is related to their geological setting, including sedimentary, magmatic, metamorphic and hydrothermal processes 	<ul style="list-style-type: none"> Pg 8, 45 Nickel Reading - http://it.geol.science.cmu.ac.th/gs/courseware/205363/WWW/Mineral%20Deposits.htm https://www.britannica.com/science/mineral- 	

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			<ul style="list-style-type: none"> environmental considerations are important in the exploration, extraction and processing of non-renewable resources, and the decommissioning of resource sites 	deposit/Hydrothermal-solution#ref624258	
1	W4	<ul style="list-style-type: none"> Sedimentary Ores- Iron, Gold, Nickel 	<ul style="list-style-type: none"> non-renewable mineral and energy resources are formed over geological timescales the location of non-renewable mineral and energy resources, including fossil fuels, iron ore, nickel and gold, is related to their geological setting, including sedimentary, magmatic, metamorphic and hydrothermal processes environmental considerations are important in the exploration, extraction and processing of non-renewable resources, and the decommissioning of resource sites 	<ul style="list-style-type: none"> Pg 8-45 Gold, 41 Case Study 1 https://www.britannica.com/science/mineral-deposit/Hydrothermal-solution#ref624258 	Task – 1 Metamorphic rock, mineral and ores identification and Cross Sections Test 5%

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1	W5	Non-renewable Energy resources – Coal	<ul style="list-style-type: none"> • non-renewable mineral and energy resources are formed over geological timescales • the location of non-renewable mineral and energy resources, including fossil fuels, iron ore, nickel and gold, is related to their geological setting, including sedimentary, magmatic, metamorphic and hydrothermal processes • environmental considerations are important in the exploration, extraction and processing of non-renewable resources, and the decommissioning of resource sites 	Pg 13 - 15, 21, 25, 34 - 38, 41 Case Study 2	
1	W6	<ul style="list-style-type: none"> • Non-renewable Energy resources – Oil and Gas 	<ul style="list-style-type: none"> • non-renewable mineral and energy resources are formed over geological timescales • the location of non-renewable mineral and energy resources, including fossil fuels, iron ore, nickel and gold, is related to their geological setting, including sedimentary, magmatic, metamorphic and hydrothermal processes • environmental considerations are important in the exploration, extraction and processing of non-renewable resources, and the decommissioning of resource sites 	Pg 15 - 17, 21, 25 - 27, 34-37	Task 4 - Renewable resources <i>Hand out</i>

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Term	Wk	Topic and key teaching points	Syllabus content	Resources	Assessment
1	W7	Environmental considerations	<ul style="list-style-type: none"> environmental considerations are important in the exploration, extraction and processing of non-renewable resources, and the decommissioning of resource sites 	Pg 38 – 49 + internet	Task 2- Non-renewable mineral and energy resources test 5%
1	W8	Water – Aquifers and effect in mining	<ul style="list-style-type: none"> human activities affect the quality and availability of fresh water, including aquifer recharge, desalination, over-extraction, land clearing and eutrophication recognition of the relatively small amounts of fresh water available for biological processes informs community decision making about investment in infrastructure and technologies to increase access to high quality water, including dams, desalination plants 	Pg 136 - 157	Task 3 Metamorphic rocks - Bells rapids field trip 25th March
1	W9	Catch up week			Task 3 - Bells Validation - 6%

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1	W10	Renewable energy resources -	<ul style="list-style-type: none"> renewable resources are those that are typically replenished at timescales of years to decades and include harvestable resources (including water, biota and some energy resources) and ecosystem services the abundance of a renewable resource and how readily it can be replenished influence the rate at which it can be sustainably used at local, regional and global scales the cost-effective use of renewable energy resources is constrained by the efficiency of available technologies to collect, store and transfer the energy resource decisions to invest in energy technologies that harness Earth's internal geothermal heat are informed by environmental, economic and political considerations 	Pg 48 - 59, 63 + Research	Task 4 - Renewable resources Presentations – 5%
Holi-day	W1	<ul style="list-style-type: none"> Kalgoorlie Field Trip 	<ul style="list-style-type: none"> 		Task 5 - Kalgoorlie Field trip
2	W1	<ul style="list-style-type: none"> Ecological footprint and ecosystems 	<ul style="list-style-type: none"> ecosystems provide a range of renewable resources, including provisioning services (including food, water, timber), regulating services (including carbon sequestration, climate control), and supporting services (including nutrient, air and water cycling) 	Pg 59 - 63 + Internet research	Task 5 - Kalgoorlie Validation 6%



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			<ul style="list-style-type: none">producing, harvesting, transporting and processing of resources for consumption, and assimilating the associated wastes, involves the use of resources; the concept of an 'ecological footprint' is used to measure the magnitude of this demand		
2	W2	<ul style="list-style-type: none">Case Study - Jarrahdale			Task 6- Human activity and ecosystems test – 5%
2	W3	Revision			
2	W4-5	Exam			Task 7 – Unit 3 – 20%

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2	W6	<ul style="list-style-type: none"> Plate tectonics <p>Magma Investigation</p>	<ul style="list-style-type: none"> Earth hazards result from the interactions of Earth systems and can threaten life, health, property, or the environment plate tectonic processes generate earthquakes, volcanic eruptions, and tsunamis. Earth hazards result from the interactions of Earth systems and can threaten life, health, property, or the environment Catastrophic events can affect other Earth processes, including the influence of volcanic emissions on climate and weather plate tectonic processes generate earthquakes, volcanic eruptions and tsunamis; these events can affect other Earth processes, including the influence of volcanic emissions on climate and weather 	<ul style="list-style-type: none"> Yr 11 textbook Pg 100 – 109 and Pg 193 	<p>Exam Feedback</p> <p>Task 8 -Magma Viscosity and Lava Flows Conduct</p>
2	W7	<ul style="list-style-type: none"> Earthquakes and Tsunamis 	<ul style="list-style-type: none"> Earth hazards result from the interactions of Earth systems and can threaten life, health, property, or the environment plate tectonic processes generate earthquakes, volcanic eruptions and tsunamis. Earth hazards result from the interactions of Earth systems and can threaten life, health, property, or the environment 	Pg 118 - 124	<p>Ass 8 – Magma Validation - 4%</p>

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Term	Wk	Topic and key teaching points	Syllabus content	Resources	Assessment
2	Wk 8	Episodic Earth Hazards	<ul style="list-style-type: none"> plate tectonic processes generate earthquakes, volcanic eruptions, and tsunamis; these events can affect other Earth processes, including the influence of volcanic emissions on climate and weather the impact of natural hazards on the biosphere depends on the location, magnitude and intensity of the hazard, and the structure and composition of Earth materials some ecosystems rely on episodic earth hazard events to rejuvenate and maintain their long-term viability, including flood plain fertility, bushfire and seed germination 	Pg 47 - 59 (National Surfing)	Task 9 Historical Climate Change extended response HAND OUT
2	W9	<ul style="list-style-type: none"> Volcanoes 	<ul style="list-style-type: none"> Earth hazards result from the interactions of Earth systems and can threaten life, health, property, or the environment plate tectonic processes generate earthquakes, volcanic eruptions, and tsunamis. Earth hazards result from the interactions of Earth systems and can threaten life, health, property, or the environment 	Pg 118 - 124	Task 9 Historical Climate Change Validation - 5%



Term	Wk	Topic and key teaching points	Syllabus content	Resources	Assessment
2	W10	<ul style="list-style-type: none"> Historical Climate change and evidence - Geo Records Current climate change and the enhanced greenhouse effect 	<ul style="list-style-type: none"> natural processes (including oceanic circulation, orbitally-induced solar radiation fluctuations, the plate tectonic supercycle) contribute to global climate changes that are evident at a variety of timescales geological, prehistorical and historical records provide evidence (including fossils, pollen grains, ice core data, isotopic ratios) that climate change has affected regions and species differently over time human activities, particularly land-clearing and fossil fuel consumption, produce gases including carbon dioxide, methane, nitrous oxide and hydrofluorocarbons, and particulate materials, that can change the composition of the atmosphere and climatic conditions, including an enhanced greenhouse effect 	Pg 160 – 174 Pg 176 - 202	Task 10 Plate Tectonics and Earth Hazards test 5% Task 11- Oceanic Circulation Investigation
3	W1-3	<ul style="list-style-type: none"> Link climate change to spheres Climate models <ul style="list-style-type: none"> - Global Conveyor Belt - El Nino La Nina - Coriolis 	<ul style="list-style-type: none"> climate change affects the biosphere, atmosphere, geosphere and hydrosphere; climate change has been linked to changes in species distribution, crop productivity, sea level, rainfall patterns, surface temperature and extent of ice sheets climate change models (including general circulation models, models of El Niño and La Niña) describe the behavior and interactions of the oceans and atmosphere; 	Pg 186 - 202	Task 11- Oceanic Circulation Investigation Validation – 4%



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		- Wind Cells - Hadley, Polar, Ferrel	these models are developed through the analysis of past and current climate data, with the aim of predicting the response of global climate to changes in the contributing components, including changes in global ice cover and atmospheric composition		
3	W4-6	<ul style="list-style-type: none">• Mind maps• Cross sections	<ul style="list-style-type: none">• Master Class		
3	W7-8	Past Exams			
3	W9-10	Exam			Task 12 Unit 3 and 4 exam - 30%
4	W1	Review Exam			