



Marine and Maritime Studies General Course Year 12

Selected Unit 3 syllabus content for the Externally set task 2027

This document is an extract from the *Marine and Maritime Studies General Course Year 12 syllabus*, featuring all of the content for Unit 3. The content that has been highlighted in the document is the content on which the Externally set task (EST) for 2027 will be based.

All students enrolled in the course are required to complete an EST. The EST is an assessment task which is set by the Authority and distributed to schools for administering to students. The EST will be administered in schools during Term 2, 2027 under standard test conditions. The EST will take 50 minutes.

The EST will be marked by teachers in each school using a marking key provided by the Authority. The EST is included in the assessment table in the syllabus as a separate assessment type with a weighting of 15% for the pair of units.

Unit 3

Unit description

This unit investigates Western Australian marine ecosystems, with a focus on estuaries, mangroves, coral reefs and seagrass meadows. Students identify the key species and food webs for each of these ecosystems, and examine adaptations of organisms living in mangrove ecosystems. Environmental and resource management will focus on aquaculture as a solution to declining fish stocks.

Students gain an understanding of maritime studies, including the characteristics of construction materials, design and construction of watercraft, and repair of fibreglass craft. The basic parts of the outboard motor, including features of two-stroke and four-stroke motors, will be studied, as well as features of small craft systems, including bilges, electrical, fuel, mooring lines and anchoring equipment.

Through a practical approach, students gain an understanding of the concepts and safe practices of power boating. Science inquiry skills will be developed through the design process in relation to construction materials used and variations in design of watercraft. Students are also involved in practical activities to collect and analyse data related to trip planning, such as weather maps and aquaculture systems.

Unit content

An understanding of the Year 11 content is assumed knowledge for students in Year 12. It is recommended that students studying Unit 3 and Unit 4 have completed Unit 1 and Unit 2.

This unit includes the knowledge, understandings and skills described below.

Science Inquiry Skills

- construct questions for investigation; propose hypotheses; and predict possible outcomes
- plan investigations, including the procedure/s to be followed, the materials required, and the type and amount of data to be collected; assess risks; and address ethical issues associated with these methods
- conduct investigations, including using ecosystem surveying techniques and line transects, safely, competently and methodically for the collection of reliable data
- represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error and inconsistencies in data; and use evidence to make and justify conclusions
- interpret a range of scientific and media texts, and evaluate the conclusions by considering the quality of available evidence
- construct and use appropriate representations, including classification keys, to communicate conceptual understanding, solve problems and make predictions
- communicate scientific ideas and information for a specific purpose, using appropriate language, nomenclature and formats, including scientific reports

Science as a Human Endeavour

- Southeast Asia has a long history of aquaculture, but rapid expansion did not start until after the mid-1970s, with the region producing a significant proportion of the world aquaculture output of food fish in terms of volume and value. Modern aquaculture technologies have been employed to raise a range of species, through a variety of methods, to meet the growing demand for this food source
- accurate weather forecasting is vital to the public and private sectors; for example, to provide severe weather warnings and to inform decision-making in marine industries. There is a huge demand to increase the accuracy and reliability of weather forecasting over longer periods of time. Weather predictions are based on interpretation of changes in factors, such as air and water temperature, the direction and speed of air and water currents, humidity and atmospheric pressure. Contemporary weather predictions are informed by computer models that take into account a range of atmospheric factors but still rely on human input to determine the best forecast model, and to interpret the model data into weather forecasts that are understandable to the end user
- maritime communication systems, including distress signals and rules and regulations for avoiding collisions within navigable waters, are based on international conventions, and are subject to change through debate and resolution

Science Understanding

Marine

Oceanography

- location and characteristics of Western Australian marine ecosystems, including:
 - estuaries
 - mangroves
 - coral reefs
 - seagrass meadows
- classification of key species relevant to the Western Australian ecosystems studied
- food chains and webs relevant to the ecosystems studied
- adaptations of organisms living in mangrove ecosystems
- construction and use of simple apparatus that can be used to measure abiotic factors of a marine ecosystem
- methods of measuring biotic factors, such as transects and quadrats

Environmental and resource management

- aquaculture as a solution to declining fish stocks
- aquaculture management by Fisheries – Department of Primary Industries and Regional Development
- Western Australian aquaculture regions and key species farmed

Maritime

Design

- characteristics of maritime construction materials; for example, wood, metals, metal alloys, fibreglass, carbon fibre and plastic
- maritime equipment, marine or watercraft, design and construction; for example, surfboards, boat hulls and anchors
- repair process and maintenance of fibreglass craft

Small craft

- the outboard motor – basic parts, function, operating temperature, compression, horsepower
- features of two-stroke and four-stroke motors
- features of small craft systems, including:
 - bilges – bilge pump
 - electrical – batteries, fuses, spark plugs
 - fuel – fuel lines
 - mooring lines – fenders, care of
 - anchoring equipment – scope, shackles
- equipment care and maintenance, including:
 - record of slippings and refits
 - rollers and fume detectors

Concepts and skills

Power boating

Trip planning

- boat preparation – safety equipment check, ramp etiquette, launch and recovery of a vessel
- components of weather – temperature, rainfall, wind, clouds, seas and swell, storms and cyclones
- marine weather forecasts – Bureau of Meteorology and other models
- weather map and forecast interpretation relating to:
 - local weather effects
 - wind against tide or current
 - wind strength/frontal squalls
- log on, log off
- chart symbols, chart types and local boating guides

Rules and regulations

- skipper's responsibilities and duty of care – new crew induction, sinking, breakdown, fire, grounding, health-related problems, man overboard, search for and rescue a man overboard, collision, capsize, abandon ship, grab bags, survival in water, duties of passengers/crews, code of conduct, rules, reporting of accidents
- registration of vessels

- port authority; licensing; recognition of operational areas and commercial regulations, including certificates of operation and certificates of competency

Safety equipment

- required and recommended safety equipment (including unprotected waters, protected waters, and registrable vessels and non-registrable vessels): lifejacket, visual distress signals (flares, electronic visual distress signal [EVDs], parachute flares), GPS-enabled Emergency Positioning Indicator Radio Beacon (EPIRB)/GPS-enabled Personal Locator Beacon (PLB), and marine radio (VHF, 27 MHz), bailer or bilge pump, fire extinguishers, anchors
- safety equipment expiry dates, care and maintenance, stowage and accessibility, safety equipment transition period (period of time to phase out old safety equipment)
- additional safety equipment: tool kit, first aid kit, fire blanket, life buoy, torch, life raft, replacement spark plugs, chart, knife, mask and snorkel, clothing, extra lines (ropes), sunscreen, water and extra fuel
- distress signals – radio (mayday, pan-pan, securite), emergency positioning indicator radio beacon (EPIRB), flares and phone

Collision avoidance

- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) buoyage (System A) – lateral, cardinal, special, isolated danger, safe water, wreck, marine safety signs and leads (sector light)
- rules and regulations for preventing collisions within navigable waters

Maintenance

- routine checks – electrical, fuel, cooling system, oil and propellers