Government of **Western Australia**
**School Curriculum and Standards Authority**

# SAMPLE COURSE OUTLINE

## FOOD SCIENCE AND TECHNOLOGY

## ATAR YEAR 12

**Acknowledgement of Country**

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

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# Sample course outline

# Food Science and Technology – ATAR Year 12

## Unit 3 – Food diversity and equity and Unit 4 – The future of food

## Semester 1

| Week | Syllabus content |
|---|---|
| 1–2 | **Nutrition: macronutrients**<br>• food sources and impact of macronutrient and water intake on health:<br>▪ protein – complete and incomplete<br>▪ carbohydrates – starches, sugars, and fibre or cellulose<br>▪ lipids – saturated fats and oils, and unsaturated fats and oils<br>• digestion of macronutrients<br>▪ digestive tract<br>▪ associated organs of digestion<br>▪ mechanical digestion<br>▪ chemical digestion |
| 3 | **Nutrition: micronutrients**<br>• food sources and impact of micronutrient intake on health<br>▪ fat-soluble vitamins – A, D, E and K<br>▪ water-soluble vitamins – B2 (riboflavin), B9 (folate), B12 (cobalamin) and C (ascorbic acid)<br>▪ minerals – calcium, iron, sodium and potassium<br>• purpose of the Nutrient Reference Values (NRV) and the Recommended Dietary Intakes (RDI)<br>• advantages and disadvantages of the consumption of micronutrient supplements |
| 4–5 | **Nutrition: diet and health**<br>• the effect of the consumption of functional foods on health<br>▪ digestive system<br>▪ cardiovascular system<br>▪ neural development<br>▪ skeletal structure<br>▪ blood sugar levels glycaemic index<br>• role of phytochemicals in promoting health<br>▪ phytoestrogens<br>▪ antioxidants<br>▪ probiotics<br>• diet-related health conditions<br>▪ food allergies – nuts, eggs, seafood<br>▪ food intolerances – gluten, lactose<br>• modification of food to meet the nutritional needs of individuals with a diet-related health condition<br>▪ food allergies<br>▪ food intolerances |

| Week | Syllabus content |
|---|---|
| | • health conditions caused by the inability of the body to digest or absorb or metabolise nutrients<br>▪ diabetes<br>▪ coeliac<br>▪ lactose intolerance |
| 6–7 | **Nutrition: influences on health and wellbeing**<br>• influences on health and wellbeing<br>▪ genetics – gender, race, family history<br>▪ lifestyle – exercise, smoking, illicit drugs<br>▪ diet<br>• use of food selection models and the *Australian Dietary Guidelines* to evaluate the nutritional needs of population groups<br>▪ anaemia<br>▪ osteoporosis<br>▪ malnutrition<br>▪ obesity<br>▪ cardiovascular disease<br>▪ diabetes<br>**Task 1: Test – Nutrition** |
| 8–9 | **Properties of food: effects of food processing**<br>• the effect of preservation processes on food<br>▪ sensory properties<br>▪ physical properties<br>▪ chemical properties<br>• the function of natural food components in food processing<br>▪ protein – albumin, gluten<br>▪ carbohydrates – starch, sugar<br>▪ lipids – fats, oils<br>• factors that impact on the properties of food<br>▪ processing techniques<br>▪ equipment and storage<br>▪ environment<br>▪ ingredients<br>▪ additives – thickeners, anti-caking agents, humectants, colourings and flavourings, preservatives, and artificial sweeteners<br>**Laws and regulatory codes: effects of food processing**<br>• *Australia New Zealand Food Standards Code* requirement for the use of additives in food and for product recall<br>**Task 2: Properties of food** |

| Week | Syllabus content |
|---|---|
| 10–11 | **Properties of food: performance of food**<br>• functional properties and how they determine the performance of food<br>▪ dextrinisation<br>▪ caramelisation<br>▪ crystallisation<br>▪ emulsification<br>▪ gelatinisation<br>▪ oxidation<br>▪ denaturation<br>▪ coagulation<br>▪ leavening<br>▪ aeration<br>▪ rancidity<br>**Food products and processing systems: performance of food**<br>• how and why food processing techniques are used to control the performance of food<br>▪ temperature – heat, cold<br>▪ exposure to air<br>▪ pH level<br>▪ addition of chemicals – salt, sugar<br>▪ removal of moisture<br>▪ manipulation<br>**Food issues: performance of food**<br>• Australian Standard metric measurement |
| 12–14 | **Food products and processing systems: production analysis**<br>• recipe adaptation<br>▪ commodities<br>▪ nutrition<br>▪ processing techniques<br>▪ portions<br>▪ presentation or packaging<br>▪ cost<br>• product proposal<br>▪ consumer profile<br>▪ product purpose<br>▪ product specifications that include at least two functional properties<br>• the technology process to produce a food product with at least two functional properties that meet product proposal specification<br>▪ investigate<br>▪ devise<br>▪ produce<br>▪ evaluate<br>• analysis of food product<br>▪ product's compliance with the proposal<br>▪ product's sensory properties<br>▪ effectiveness of the processing techniques selected<br>▪ purpose of the functional properties selected<br>**Task 3: Production analysis** |

| Week | Syllabus content |
|---|---|
| 15 | **Laws and regulatory codes: food safety management**<br>• apply the principles of the Hazard Analysis Critical Control Point (HACCP) management system to manage food safety<br>▪ conduct a hazard analysis<br>▪ identify critical control points<br>▪ establish critical limits for each critical control point<br>▪ establish critical control point monitoring requirements<br>▪ establish corrective actions<br>▪ verify procedures<br>▪ establish record keeping procedures<br>• *Food Act 2008* (WA) and the role of state and local authorities to ensure food for sale is safe and suitable for human consumption.<br>• *Work Health and Safety Act 2020* and the consequences of unsafe work environments and practices for employers and employees<br>▪ economic<br>▪ social |
| 16 | **Task 4: Semester 1 examination** |

## Semester 2

| Week | Syllabus content |
|---|---|
| 1–2 | **Food issues: promoting food**<br>• marketing mix strategies and the influence on consumers<br>▪ product<br>▪ price<br>▪ place<br>▪ promotion<br>• consumer concerns related to food promotion<br>▪ advertising directed at children<br>▪ product placement in supermarkets<br>**Food products and processing systems: promoting food**<br>• analysis of the marketing mix used to promote a food product<br>▪ product<br>▪ price<br>▪ place<br>▪ promotion<br>**Laws and regulatory codes: promoting food**<br>• implications of the *Australian Association of National Advertisers (AANA) Code for Advertising and Marketing Communications to Children*, on advertising and marketing food and beverage products in Australia<br>**Task 5: Food promotion** |
| 3–4 | **Food issues: food and consumption**<br>• factors that influence food consumption patterns in Australia<br>▪ social<br>▪ economic<br>▪ environmental<br>▪ ethical<br>▪ political<br>• the impact of commercially processed food on the consumer<br>▪ food safety<br>▪ food availability<br>▪ extend shelf life<br>▪ convenience<br>▪ alter sensory properties<br>▪ health<br>▪ distribution and storage<br>▪ price<br>• mathematical concepts – data, graphs, tables, simple ratio, percentages |
| 5–6 | **Food as a commodity: sustainable food production**<br>• environmental issues that impact sustainable production of food commodities<br>▪ water use<br>▪ land use<br>▪ chemical use<br>▪ energy use<br>▪ waste disposal |

| Week | Syllabus content |
|---|---|
| | • biotechnology in food systems<br>  ▪ microorganisms<br>  ▪ yeasts<br>  ▪ genetic modification<br>• the process of genetic modification in food production<br>• benefits of genetic modification<br>  ▪ improved yield<br>  ▪ improved nutrition<br>  ▪ resistance to environmental conditions<br>  ▪ improved sensory properties<br>  ▪ lower commodity prices for the consumer<br>• risks of genetic modification<br>  ▪ impact on health<br>  ▪ impact on environment<br>  ▪ antibiotic resistance<br>**Laws and regulatory codes: sustainable food production**<br>• *Australia New Zealand Food Standards Code* for food produced using gene technology<br>**Task 6: Sustainable food production** |
| 7–8 | **Food issues: product development**<br>• factors that influence the development of new food products<br>  ▪ population growth<br>  ▪ changing demographics<br>  ▪ health<br>  ▪ convenience<br>  ▪ cost<br>  ▪ technology<br>**Food as a commodity: Product development**<br>• innovative developments that increase the availability of food<br>  ▪ value-added food<br>  ▪ functional food<br>  ▪ genetically modified food<br>  ▪ food safety procedures<br>  ▪ packaging<br>**Food products and processing systems: product development**<br>• product development using line extensions, 'me too' products and innovative products<br>• adaptations used to produce new products<br>  ▪ commodities<br>  ▪ processing techniques<br>  ▪ presentation or packaging<br>  ▪ equipment and technology<br>  ▪ quantities |

| Week | Syllabus content |
|---|---|
| 9 | **Properties of food: technologies and new food products**<br>• technologies used to develop new food products<br>▪ ultrafiltration<br>▪ micro-encapsulation<br>▪ nanotechnology<br>▪ high pressure processing<br>▪ membrane technology<br>▪ packaging – aseptic, active, intelligent and Modified Atmosphere Packaging (MAP) (vacuum, gas, barrier specific) |
| 10–12 | **Food products and processing systems: product proposal and analysis**<br>• recipe adaptation<br>▪ commodities<br>▪ processing techniques<br>▪ portions<br>▪ presentation or packaging<br>▪ cost<br>• devise a product proposal for a new food product<br>▪ consumer profile<br>▪ product purpose<br>▪ product specifications<br>• the technology process to produce a new food product that responds to a consumer need<br>▪ investigate<br>▪ devise<br>▪ produce<br>▪ evaluate<br>• analysis of food product in relation to product proposal<br>▪ features of the product and its suitability to the consumer group<br>▪ quantitative method (survey)<br>▪ qualitative method (sensory evaluation)<br>▪ draw conclusions<br>▪ make recommendations<br>**Task 7: New product proposal** |
| 13–15 | **Food issues: food supply**<br>• factors affecting the sustainability of food production in Australia<br>▪ farming practices<br>▪ climate change<br>▪ water availability<br>▪ land degradation<br>• influences on the global food supply<br>▪ trade restrictions – embargos, tariffs, subsidies<br>▪ government policies – free trade agreements, fair trade<br>▪ ownership concentration within the food industry – multi-national companies<br>▪ natural disasters and the potential loss of infrastructure<br>▪ land ownership |

| Week | Syllabus content |
|---|---|
| | • influences on the distribution of global food resources<br>▪ production of biofuels<br>▪ population growth and population distribution<br>▪ food production and distribution<br>▪ food prices<br>▪ demand for meat and dairy<br>• consequences of global food inequity<br>▪ under-nutrition<br>▪ over-nutrition<br>▪ political instability |
| 16 | **Task 8: Semester 2 examination** |